The Builder.

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ILLUSTRATIONS.

The United Mill, Oldham (Plan, 1082; Section, 1084).—Mr. Thomas Mitchell, Architect 1083

CONTENTS.

The "Cloaca Maxima" of the "Metropolis Magna"	1073	Floods and Bridges	1083
"The Eighteenth Century in France": Theatres and Costume	1076	United Mill, Oldham	1083
Protection of Timber in Harbour Works, Jetties, and Piles	1077	Civil and Mechanical Engineers' Society	1083
Ancient and Modern Egypt: Royal Institute of British Architects	1078	A Visit to Gresford Church and Neighbourhood, North Wales	1087
Society of Painters in Water Colours	1079	Japanese Art and Industry	1088
The Lions at Home	1079	The Whitefriars Theatres	1088
Iron Varnish	1080	Proposed Street Improvements at Durham	1088
New Passenger and Carriage Depôt at Rotherhithe for the South-Eastern Railway Company	1080	The Registration of Trade-marks	1088
The European Artisan in Greece	1081	Portsmouth Improvements	1089
Stamps on Contract Plans and Specifications	1081	County Courts	1089
New Small-pox Hospital for Glasgow	1081	Hayhoe's Patent Solvent	1089
Dwellings of the Damascene Workpeople	1082	Are Bulging Walls to be Repaired by Tenant? Pulley v. Cooper	1089
		New Cemeteries	1089
		An Election by the Brentford Local Board	1090
		A Festival in the Potteries	1090
		Cambridge Antiquarian Society: an Ancient Tomb in Algeria	1090
		The Gardens of the Inner Temple	1090
		Stained Glass	1090
		Building in Stoke Newington	1090
		Female School of Art	1091
		Building on Bones	1091
		An Indecorous Circular	1091
		School Board Schools	1091
		Vacant District Surveyorships	1091
		Timber	1091
		The Powers of Local Boards	1091
		Church-Building News	1092
		Miscellanea	1092

The "Cloaca Maxima" of the "Metropolis Magna."

COUNTRY people have a saying that "the streets of London are paved with gold," and, verily, when we come to sum up the vast amount of wealth sunk both *in* and *under* the metropolitan thoroughfares, it seems to admit of the bullion being spread, like so much gravel, over every square yard of earth trodden beneath the feet of the mother-citizens.* We have but to learn that the 2,500 miles of its roadways must have cost upwards of thirty odd millions of pounds to construct, and, lo! the very pavement appears to be inlaid with *precious stones*. Nor are the treasures which are buried beneath the soil less prodigious than those which are invested in it. The gas-mains which thread the substratum in every direction, like the veins beneath the skin of this Giant of a capital of ours; and the sewers, which are but the bricken intestines packed within the huge bowels of this same Monster of a metropolis, seem, when we come to reflect upon the cost of spinning the warp and woof of the mighty subterranean web, as if even the shoeless London beggar walked upon a "cloth of gold," more costly than that which was spread for the proud feet of the two voluptuous monarchs on their meeting between Guisnes and Ardres, near Calais. The expense of laying down the 5,000 miles of gas-mains throughout the metropolis, we have shown, could not have been less than three to four millions sterling; and now we come to inquire what amount of money must it have taken to fashion the enormous net-work of sewerage required to carry off the vast feculent flood of sewage daily provided by the four millions of human beings that make up the aggregate population of the capital.

Let us see.

But, first, there must be something like "method"—if not "in our madness"—at least to check the rambling vagaries of erratic reasoning. Method is, so to speak, the railroad of logical exposition: not only does it make the mental travelling easy and rapid, but, if the line be well laid down, it brings us, in the most direct manner, to our destination. For, in sooth, order is a potent intellectual *engine* in connexion with a long *train* of thought, and carries the mind, by the gentlest gradients, almost imperceptibly to the distant terminus.

The subject in hand, then, naturally arranges itself into three broadly-demarcated divisions:—

I. The sewage (or matter to be carried off); the materials, quantity, and quality of it.

II. The sewerage (or means of carrying it off); the character and extent of it.

III. The cost of construction and mode of government.

But, *imprimis*, a few words, by way of introduction, as to the social and sanitary, if not moral, necessity for making some provision for the due removal of the refuse from every large town.

The round of Nature is ever a perfect circle. Food makes the muck-heap, and the muck-heap makes food. Water, carbonic acid, and ammonia constitute the main ingredients of the nutriment required by every form of plant. These compounds are either absorbed or decomposed by the roots and leaves; and, being ultimately resolved into their elements (namely, carbon, oxygen, hydrogen, and nitrogen), become eventually,—together with certain inorganic elements derived from the soil,—elaborated by the vegetable organism into what are called "proximate principles"; or, in other words, into some form of vegetable structure fitted for the nutrition of animals,—that is to say, into all the modifications of "proteine" (the basis of muscular tissue), as well as into sugar, gum, and starch, and also into fat.

In the animal system, on the other hand, these same proximate principles are successively reconverted into the more simple forms from which they were originally derived, and thus finally made to *reproduce* the very carbonic acid, ammonia, and water required for the nutriment of plants; for carbonic acid and water are copiously evolved by the lungs, as well as from the skin; the kidneys secrete urea, which readily passes into carbonate of ammonia; and the inorganic substances are evolved in the *ejecta* of the bowels.

But the respective functions of vegetable and animal life have been so well contrasted by MM. Dumas & Cahours that we cannot do better than collocate them here in the same striking form:—

Vegetables.		Animals.	
Produce	...Proteiniferous compounds.	*Consume*	...Proteiniferous compounds.
,,	Fatty matters.	,,	Fatty matters.
,,	Sugar, starch, and gum.	,,	Sugar, starch, and gum.
Decompose	Carbonic acid.	*Produce*	...Carbonic acid.
,,	Water.	,,	Water.
,,	Ammonia.	,,	Ammonia.
Evolve	.....Oxygen.	*Absorb*	.....Oxygen.
Absorb	.....Heat and electricity.	*Evolve*	.....Heat and electricity.
Constitute	...An apparatus of *reduction*.	*Constitute*	...An apparatus of *oxydisement*.
Are	.....Stationary.	*Are*	.....Locomotive.

One of the main uses of plants, indeed, is to change the inorganic earth, air, and water into the organic substances fitted for the nutrition of animals. The iron in our blood, and the lime in our bones, were originally in the soil, and could not have been in our body unless they had formed part of our food. Yet we live neither on metal nor on stones. It is, however, by means of the vegetable kingdom that we are enabled to convert the mineral into flesh and blood,—body and bones. Still, by what subtle transmutation inorganic nature becomes changed into organic, and dead inert matter gets to be quickened with all the exertion of life, is far beyond us, even to conjecture. Suffice it, an express apparatus is required for the purpose,—a special mechanism needed, in order to adapt the hard "*crust* of the earth," as it is called, as food for man and beast.

Nature, however, in the wondrous wisdom of her economy, has been even more careful of her children still. Not only has she ordained that the refuse of animals should be the congenial nutriment of vegetables; but (so that mere instinct should induce us to seek the removal of our ordure) she has rendered that which is rejected from the animal body as repulsive to the animal senses as it is poisonous to re-absorb into the animal system. The carbonic acid exhaled by the lungs is so noxious to human life, that, inhaled in a pure state, it produces immediate asphyxia; whilst even three to four parts of it diluted with 100 parts of atmospheric air are sufficient to act as a deadly narcotic poison. Moreover, sulphuretted hydrogen, which is the fœtid gas evolved by human ordure, is so innately offensive, that 1-1500th part of it (0·066 per cent.) mixed with the air is enough to produce intense nausea and vertigo, and 1-800th (0·125 per cent.) to kill a middle-sized dog; while even 1 part of it mingled with 150 parts (0·66 per cent.) of the atmosphere proves fatal to a horse. Hence, whilst the noxiousness of carbonic acid should enforce perfect *ventilation*, the loathsomeness and deleteriousness of sulphurhetted hydrogen should lead to equally perfect *sewerage*—in every enlightened community.

Plants, however, are not only nature's scavengers, but they are nature's purifiers also. They disinfect the atmosphere, as well as remove the filth from the soil; and so fit the air to be breathed by a higher order of beings. Without the vegetable creation, animals could neither have been nor be. The trees, herbs, grasses, and flowers not alone adapted the earth originally for the residence of man and the brute, but to this day they continue to render it habitable to us. Hence their nature has been made the very opposite to ours. That which we egest as pollution to our system, they assimilate as nourishment to theirs. What our bodies reject, their roots imbibe; what our lungs throw off, their lungs absorb; the gas which is a mephitic* poison to us, is vital air to them.

In order, therefore, that the balance of waste and supply should be maintained, and the principle of universal compensation kept up, Nature has given us several instinctive motives to remove our refuse from us. She has at once constituted that which we eject from our bodies the most loathsome of all things to our senses and imagination, as well as rendered its effluvium highly pernicious to our health,—sulphuretted hydrogen being, as we have said, the most deleterious and also the most offensive of all gases. Consequently, as in all cases where some great law of Nature has to be enforced by special injunctions, a *double* motive has been instituted, in order to *drive*, as well as *lead*, us to do that which is necessary for our well-being; and thus it has been made not only advantageous for us to remove our refuse to the fields, but positively detrimental to our health, and disgusting to our senses, to keep it in the neighbourhood of our houses.

In every well-regulated State, therefore, some effective and rapid means of carrying off the refuse of the community to a locality where it may be fruitful, instead of destructive, becomes a most important part of the social machinery; since it is manifest that to allow the exhalations from the excreta of a large body of people to contaminate the air within range of their nostrils and their lungs (instead of serving to nourish the

* Metro-polis = μητηρ + πολις, *i. e.* the mother-city; chief city of a country or district.

* From *Mephitis*, the name of the goddess of *stenches*, who was supposed to preside over the ancient "*Cloacæ*."

plants fitted for their sustenance) is not alone to poison but to starve, the populace,—so true is it, in the scheme of vegetable and animal life, that what is a *boon* to the one is a *bane* to the other.

We are told in one of the Reports of the quondam Metropolitan Commission of Sewers, that Dr. Paley, the celebrated moralist, was wont to give Burckhardt and other African explorers a set of instructions as to points of observation concerning the manners and condition of the people among whom they were about to travel; and one of the main points in these was, "What the natives did with their ordure?" for the mode in which they disposed of *that* was, to the reverend Doctor's mind, a sure indication as to how far the race had advanced in civilisation, or how deep it was sunk in savagery. Indeed, the author of the far-famed "Natural Theology" was accustomed to declare that the facts connected with this topic gave him more information respecting the moral status of a population than the vulgar generally would suppose. "It taught him," he urged, "their habits of cleanliness, and their sense of decency and self-respect, as well as their susceptibility to those cognate moral sentiments which are of the highest social importance."

"The human ordure," adds the Report above referred to, "which defiles the churches and the bases of public edifices and works of art in Rome and Naples, as well as the Italian cities generally, affords more sure indication as to the real social and moral condition of the Italian populations than any impressions derived from the edifices or works of art themselves. Indeed," the Report concludes, "the subject concerning which the Jewish law-giver did not think it beneath him to lay down the most particular directions is one of the safest social tests as to the sense of refinement and propriety existing among different peoples."

Ay; for though it be true that "to the pure all things are pure," still, it is certain, the converse is equally true,—that "with the filthy even filth itself excites no sense of filthiness"; and as cleanliness is next to Godliness, so decency is close akin to Christianity, springing as it does from a fine sense of respect to the feelings of others.

Such, then, are the most salient physical and moral reasons for every enlightened community making some special provision for the removal of the refuse of the people from the immediate vicinity of the people themselves. Nature, in the very repulsiveness of a mass of rotting organic matter, bids us "get rid of the filth for our own *health's* sake"; for the stench is but a warning against the impending danger. Prudence says, "Get rid of it from your houses, but husband it in your fields, for its own *wealth's* sake"; for that which breeds disease and death in the town makes food and new life in the country. And Decency cries aloud, "Get rid of it for *goodness'* sake"; for there can be no goodness without purity; and pure air makes pure blood, pure blood a pure body, and pure bodies make pure minds.

But to cleanse an Augean stable with a stud of 4,000,000 living creatures stalled in it is, indeed, a Herculean task. Just think, for a while, and endeavour to form a concrete idea as to what a heap the mere excreta from such a herd of animals would form. Moreover, houses and towns have their excretions as well as animals themselves. The house-drains and street-drains are to our tenements and cities what the intestines are to the animal structure,—a mere series of tubes for the removal of so much sulliage. But who speculates as to what must be the extent of the *detritus* accruing year after year in a metropolis covering, as ours does, not less than 78,000 and odd statute acres, or 115 square miles,—where there are nearly half a million inhabited houses, and 2,500 miles of streets and roads? Who wonders as to how many tons upon tons of refuse earth have to be carried away *somewhere* from the excavations perpetually going on in and around London in the course of each twelvemonth; or as to the thousands on thousands of cartloads of old bricks and mortar which have to be got rid of *somehow*, from the old houses which are continually being pulled down (at the annual rate of 1 in every 200 of the entire buildings) during the year? Who but some zealous sanitary engineer worries his wits concerning the provision made for removing the millions of loads of mud and the millions of tons of street surface-water which are annually being deposited upon the endless miles of the almost endless thoroughfares, or as to the Niagara-like outfall of the collective "slops" from the infinite households crowded within the vast metropolitan area? And yet in an enormous city like ours all these various forms of refuse have to be thought of and provided against; else this *very* great "Great Metropolis" would, at its present rate of wear and tear, assuredly become one vast rubbish-heap,—a huge dust-heap and muck-heap,—ere another century had passed over its head.

So this brings us, in due course, to the consideration and classification of the different forms of refuse; for rubbish admits of being logically divided and subdivided as well as the more sterling and solid matters of common sense. Before proceeding to deal, therefore, with the quantity and quality of the metropolitan sewage, let us clear the ground of the wilderness of tangled ideas besetting it, and endeavour to give the reader some definite notion as to the several kinds and varieties of refuse in general.

Well, the refuse of a town consists of two kinds:—(1.) The street refuse; and (2.) The house refuse; and of each of these kinds there are two distinct species, viz.,—(*a.*) The dry or solid; and (*b.*) The wet, whether in a fluid or semi-fluid state.

The dry street-refuse consists principally of refuse earth removed during excavations, refuse bricks and mortar, the sweepings of the shops, and the dust of the streets; whilst the dry house-refuse is made up of the soot and ashes of our fires, the sweepings of the house-floors, the parings of vegetables, and the offal from meat, as well as the remains of broken bottles, crockery, &c.; in a word, the general contents of the dust-bin. The wet street-refuse, on the other hand, comprises the mud, horse-droppings, and surface-water of the public thoroughfares; while the wet house-refuse includes what is familiarly known as the "slops" of a household, the outpourings from the water closet and the rain-pipes, as well as the liquid refuse from the several factories and slaughter-houses.

With the different forms of *dry* refuse we have, of course, nothing to do here, seeing that such matters seldom or never enter the sewers, and are generally removed by the cart of the rubbish-carter, the scavenger, or the dustman. It is only the *wet* refuse of our streets and houses that concerns us in this place; for that alone is what can be said to constitute the *sewage* of a town,—the dry refuse being merely the rubbish of a city, and, from its having no principle of fluidity belonging to it, admitting of being carted off and "shot" into appointed "heaps," rather than being susceptible of *drainage*,—*i.e.*, of being carried away, by the mere flux of gravitation, through a series of broken tubes or earthen pipes, to some convenient "outfall."

The sewage of a town, then, consists of the wet refuse either of the streets or the houses,—the *drainage* of the thoroughfares and the domiciles throughout the city. And now let us endeavour to arrive at some estimate as to the quantity of this same drainage arising from a capital where the roadways are more than one fourth of the diameter of the earth in length, and the tenements greater in number than the dwellings in many a German Principality.

The main "feeders" as regards the surface-water of the London streets are, of course, the rains. The average quantity of rain, therefore, falling annually upon the entire metropolitan area will give us some idea as to the amount of street surface-water which the sewers of London have to carry off in the course of the year. The following table shows,—

THE AVERAGE RAINFALL IN LONDON DURING TEN YEARS

(*According to the Observations of the Royal Society and Mr. Luke Howard*).

Months.	Average Depth of Rain in Inches according to the Observations of		Quantity of Rain falling at different Seasons in Inches.	Number of Days on which Rain falls in each Month.
	The Royal Society.	Mr. Luke Howard.		
January...	1·56	1·907	1st Quarter, 5·868	14·4
February	1·45	1·643		15·6
March ...	1·36	1·542		12·7
April	1·55	1·719	2nd Quarter, 4·813	14·0
May	1·67	2·036		15·8
June	1·98	1·964		11·8
July	2·44	2·592	3rd Quarter, 6·682	10·1
August ...	2·37	2·134		16·3
Septembr.	2·97	1·644		12·3
October...	2·46	2·872	4th Quarter, 7·441	18·2
November	2·88	2·637		18·0
December	1·65	2·489		17·7
Total ...	24·04	25·179	24·804	178·1

According to Mr. Glaisher, the quantity of rain which fell in London in 1873 amounted to 23·5 in., and that was 0·6 less than the average of thirty-two years; so, coupling this fact with the returns above cited, we may safely assume the mean rainfall in the metropolis to be, in round numbers, 24 in. per annum.*

Now, as we have said, the area of "London according to Act of Parliament," comprises exactly 78,080 statute acres (= 115 square miles); and as every statute acre contains 6,272,640 square inches, it follows that the entire metropolitan area must contain not less than 489,767,731,200 of such inches. Hence, this number multiplied by 24 (the average depth in inches of the rain falling in London, upon every square inch of ground, in the course of the year) will give us the gross number of cubic inches contained in the average annual metropolitan rainfall; and then we have but to reduce these into gallons, and the gallons into pounds avoirdupois, in order to arrive at the volume and weight of the whole.

But, not to bore the reader with the dry details of the calculation, we shall proceed at once to state the results.

The average yearly rainfall in London amounts to 11,754,425,548,800 cubic inches, or 6,802¼ million cubic feet; and the average daily ditto, as nearly as possible, to 32,204 million cubic inches, or 18¾ million cubic feet.

This is equal in volume to very nearly 42,400 million gallons in the course of the year, or to upwards of 116 million gallons, on an average, in the course of each day,—which is at the rate of rather more than 200 million tuns (of four hogsheads each) annually, and upwards of half a million tuns (550,000) daily; and since a tun by measure is very nearly a ton by weight, it follows that the gravity and the volume will be almost the same in amount.

Hence, the conclusion is: the average quantity of rain falling within the metropolitan area is equal to rather more than 6,800 million cubic feet, or upwards of 200 million tuns, as well as tons, per annum; and this is at the rate of 18¾ million cubic feet, or 550,000 tuns, as well as tons, per diem.

"Taking an average of several years," says Sir Joseph Bazalgette in his account of "The Metropolitan System of Drainage, and the Interception of the Sewage from the river Thames," "it has been ascertained that there are about 155 days per annum" (178 according to the table above given) "upon which rain has fallen. Of these there are only twenty-five upon which the quantity has amounted to ¼ in. in depth in twenty-four hours, or the one-hundredth part of an inch per hour if spread over an entire day." But, on the other hand, "there are," as Sir Joseph truly says, "in almost every year, exceptional cases of heavy and violent rain-storms; and these have measured 1 in., and sometimes even 2 in., in an hour."

With such abnormal rainfalls, however, we have no necessity to trouble ourselves at present. The first problem to be solved is: what becomes of the enormous volume of rain which is poured down every year upon the metropolitan area,—a volume equal, as we have shown, to more than 6,800 millions of cubic feet, or 200 million tons weight per annum; and which, if spread out into one large lake, would form a vast sheet of water 2 ft. deep and 115 square miles in extent, and stretching from Chiswick to North Woolwich in one direction, and from Highgate to Norwood in the diametrically opposite one. One thing, however, is certain, and that is: the *whole* of this surface water does not enter the sewers; for in the report of Messrs. Bidder and Hawksley upon the subject it is said the fact has been established, from observations made in the year 1857, "that the quantity of rain which flows off by the sewers is, in all cases, *much less* than the quantity which falls on the ground; and although

* From the Royal Society's observations it would appear that the London rainy season occurs in September, November, and October, and the dry season in April, February, and March. Both Mr. Howard and the Royal Society agree in making March the dryest month of the year, and in placing October and November among the wettest ones. Mr. Howard, however, gives the average quantity of rain falling in September as only 1·644 in., whereas the Royal Society makes the mean rainfall during that month 2·97 in., or as much as 80 per cent. more, and so ranks it as the wettest of all the months in the year. Again, according to the Royal Society's tables, December is comparatively a dry month—the normal quantity of rain then amounting to but 1·65 in.; whilst, in the tables of Mr. Luke Howard, December comes among the wettest months—the rainfall during that period being made as high as 2·489 in., or 50 per cent. more. Moreover, it may be observed that very nearly 40 per cent. of the days in London appear to be wet ones, so that there is more or less of a shower occurring in the metropolis on almost every other day throughout the twelvemonth.

the variations of atmospheric phenomena are far too great to allow any philosophical proportions to be established between the rainfall and the sewer-flow, yet we feel warranted," say the gentlemen in question, "in concluding, as a rule of averages, that a ¼ in. of rainfall will not contribute more than ⅛ in. to the sewers, nor a fall of $\frac{1}{10}$ in. yield more than ¼ in. Indeed," they add, "we have recently observed rainfalls of very sensible amount failing to contribute any distinguishable quantity to the sewer flow."

Now, according to the above observations, it would appear that only about *one-half* of the gross amount of rain falling upon the metropolis finds its way down the "gullies" into the street-drains. What, then, becomes of the other half? "Of this," says Sir Joseph Bazalgette, "a large proportion is evaporated or absorbed, and either does not pass through the sewers at all, or does not reach them until long after the rain has ceased." And yet, in another part of the same work, while treating of the quantity of sewage to be intercepted, Sir Joseph says "That portion which is absorbed and evaporated is *compensated for by the dry-weather underground-leakage into the sewers.*"

Of course, the portion of the rain which finds its way into the drains can be only such as falls on that part of the metropolitan area which is occupied by buildings or streets. What descends upon the suburban fields, gardens, parks, and other open spots is, in a measure, imbibed by the soil. Moreover, a large proportion of the rain falling on the streets either sinks into the ground or is retained by the dust which is ultimately converted by it into mud. Hence, that alone which pours down on the housetops and the yards can be said to contribute in any considerable degree to the gross quantity of wet street-refuse discharged into the drains.

Now the streets of London are said to take up one-eighth part, and the houses another eighth part of the entire metropolitan area.* The eighty-six and a quarter square miles, therefore, which remain after deducting the space occupied by the streets and the houses from the 115 which are comprised within the limits of what is now termed "Registration London," may be said to be made up of suburban gardens, fields, parks (and the latter, according to a late return of the Ordnance Department, are, altogether, somewhere about three square miles in extent), commons (such as Clapham and Wimbledon), greens (such as Camberwell-green and Brook-green), downs (such as Hackney Downs), and heaths (such as Hampstead-heath and Blackheath). In such places, however, the rain, unless very heavy, would naturally sink into the earth. We have then only about one-fourth of the gross London rainfall,—*i.e.*, the portion descending upon the housetops and the streets,—which would be likely (except in the case of the abnormal rainstorms mentioned) to enter the metropolitan sewers; and reckoning a considerable proportion of this to be absorbed by the dust of the roads, we land at the conclusion that *less than a quarter* of the total quantity of rain-water falling over the London area makes its way into the drains. Well, therefore, might Messrs. Bidder and Hawksley assert that "as a rule of averages, ¼ in. of rainfall *will not contribute more* than ⅛ in. to the sewer flow, and that they had observed *rainfalls of very sensible amount failing to yield any distinguishable quantity to the sewers.*"

But, even of this one-fourth part of the entire London rainfall, how much can really be said to reach the gullies of the drains? Now, how is such a point to be settled? Why, simply by ascertaining the quantity of street-mud which is annually removed from the London thoroughfares; and this brings us to the consideration of the second form of wet street-refuse before enumerated.

The scavengers, to whom we must resort for the scientific classification of this branch of our subject,—the natural history, as it were, of dirt ("dirt," which Lord Palmerston described as "matter out of place"),—divide the street-refuse into four distinct species, to wit:—(1.) Street-dust, which, as Miss Landon said, is merely "mud in high spirits," *i.e.*, mud which, having got rid of the sober influence of the rain, has become rather "flighty," and is wont to circle away in mid-air as if it were really of an ethereal nature. (2.) Mud proper, or "Mac," as it is termed, according as it is either merely *swept* from off the granite or wood pavement, or both *scraped* and *swept* from the surface of Macadamised roads. This form of street-dirt is, of course, simply the dust or *detritus* of the paving agglutinated by the rain into a more or less semi-fluid consistence, but which, not having sufficient liquidity in it to be able to flow off, or be carried down, by the flux of gravitation, into the drains, has to be gathered into heaps by the scavenger's broom, and then shovelled up into carts, in order to be removed to some convenient "shoot." (3.) "Slop-dirt," as the scavengers style the still-more-fluid mud, but which has, nevertheless, sufficient consistence about it to admit of being swept from the surface of the pavement, and ultimately shovelled up and carted off, as in the other case, to some appointed "outfall." And (4.) the street "surface-water," which has enough liquidity belonging to it to flow off by itself into the channels and thence down the gullies and drains connected with the roadways.

We have to deal here merely with the two medium forms of street refuse, and by showing how many cartloads of mud and slop-dirt are removed in the course of each year from the London thoroughfares, endeavour to ascertain how much of the aggregate rainfall is absorbed by the dust of the streets and so converted into this same mud and dirt. Now, it would appear, from inquiries among the parish surveyors and contractors for cleansing the roads, that the average quantity of mud collected daily during the wet season from the different metropolitan thoroughfares varies from one cartload and a half per mile in those of the greatest traffic to three-fourths of a load per mile in the least frequented districts. There are about 200 miles of granite-paved streets (50 within the City, and 150 outside of it), which may be said to yield about one load and a half of mud per mile, and some 250 more miles of similarly-paved streets, which yield but three-fourths of a load; or say that the 450 miles of such streets produce altogether 500 cartloads daily throughout the wet season. The yield of "Mac" is, of course, considerably greater, owing not only to the Macadamised roadways being 1,900 and odd miles long, whereas the granite-paved ones are little more than 570 miles in length, but owing also to the quantity of mud produced by such roads being proportionately larger. Assuming then that the thoroughfares yielding "Mac" are only 1,800 miles in length, and that 200 miles of these where the traffic is greatest produce two loads daily per mile, and that the remaining 1,600 miles yield but three-fourths of a load per mile a day, we have 1,200 loads per diem for the gross amount of mud and slop-dirt collected from the entire Macadamised roads of the metropolis. Then, adding this amount to the 500 loads yielded by the granite-paved streets, we have an aggregate daily yield of 1,700 cartloads. But this quantity is collected daily during the wet season only; and as rain falls in London on but every other day, on an average, throughout the year, it follows that the average daily yield of mud and "Mac" would be merely half the above-mentioned amount, or 850 loads or tons per diem if taken for the whole twelvemonth.

Now, the mean daily rainfall we have shown to amount, in round numbers, to 550,000 tons in weight, and tuns in volume, or about 19 million cubic feet; but it has also been shown that only one-fourth of this quantity, or 137,500 tons, falls upon the housetops and roadways of the metropolis, and that this is the entire amount which, under ordinary circumstances, can find its way into the metropolitan sewers. Moreover, of these 137,500 tons, we have just seen that 850 tons are daily converted into as many cartloads of mud and "Mac," by the commingling of the rain-water with the dusty *d-ritus* of the roads; and, therefore, we may conclude that the London rainfall adds, on an average, about 130,000 and odd tons, or rather more than 4¾ million cubic feet per diem to the aggregate sewage of the capital.

But if less than a quarter of the whole of the ordinary rainfall enters the London sewers, it is far different with the water supplied artificially, rather than naturally, to the metropolis. For the water which is artificially supplied to the metropolitan houses is the main source of the *wet house-refuse*; and for this form of house-refuse there is hardly any other outlet than the house-drains and the sewers themselves. Consequently, in order to arrive at the amount of sewage which proceeds from the wet-refuse of the London houses, we must ascertain the amount of the London Water Supply, for it is self-evident that the quantity of the one must be almost tantamount to that of the other, seeing that the volume of the wet house-refuse can hardly be more or less than that of the whole of the water supplied to the different dwellings and factories. Thanks to the several metropolitan companies, the returns furnished to the Registrar-General make the amount of the London water-supply a point which is readily determinable; and, accordingly, we find, on referring to the accounts given in the official report of 1873, that "the average *daily* quantity of water supplied by the eight London companies" in the course of that year was, 113,188,809 gallons." Add to this eight million gallons derived from Artesian wells every day, and two million more gallons from land springs, and we have a gross water supply of 123,188,809 gallons per diem.

Now, this number of gallons is equal to 549,950 tons, or about 19,765,200 cubic feet. But the average daily rainfall in London we showed to amount to 550,000 tons, or 19,767,000 cubic feet; so that, strange to say, the average quantity of water which is supplied *artificially* every day to the metropolis, by means of the water companies, &c., is as nearly as possible equal to the average daily quantity which is supplied *naturally*, by means of the rain! What connexion the one supply can by any means have with the other it is difficulty to perceive; but the coincidence is, at least, very striking and worthy of remark.

"According to the returns of the London companies made to the Select Committee on the East London Water Bills (Session, 1867)," adds the Registrar-General, in a foot-note appended to the table of the London Water Supply for 1873, "it was estimated that, during the year 1866, about 82 per cent. of the total supply of water for all purposes was for domestic use. This proportion has been applied," continues the foot-note, "in computing the number of gallons probably used for domestic purposes" by each household,—the average daily quantity made use of in this way being 18¼ gallons per house, and the average daily supply to the entire metropolitan population at the rate of not less than 25·9 gallons per head. But if only 82 per cent. of the whole of the water supplied to the metropolis is used for domestic purposes, the natural query is,—What becomes of the remainder? The answer is found in the "Minutes of Proceedings taken before the Commissioners appointed to inquire into the Regulations for a constant Supply of Water to the Metropolis"; wherein it is shown that a considerable proportion of the gross water supply is devoted to the purposes of trade,—the proportion in the case of the East London Company being estimated as high as 26·2 per cent., and that of the Kent Company as low as 3·2 per cent. Moreover, it is reckoned that probably one-third of the whole supply (or as much as 37¾ million gallons out of the whole 113 and odd millions) is *wasted* every day; so that 8¾ gallons out of the 26 supplied to each person per diem are devoted to no purpose whatever.

Now it is manifest that nearly *all* the water consumed or wasted in London must go to form the bulk of the total wet house-refuse discharged into the London sewers. There are, however, a few exceptions; though the water diverted from the drains in such cases forms so trifling a proportion of the gross supply that it is hardly worth mentioning. First, there is the quantity used in the extinction of fires. This the Registrar-General tells us amounted, in the year 1873, to upwards of 22½ million gallons, or about 100,000 tons; but as only one-third of this quantity, or 7½ million gallons, was derived from the street-pipes (the remainder being obtained from the river, the canals, and the docks), and this gives an average of but little more than 20,000 gallons a day, there is no necessity to cumber the present calculation with so trifling a drawback. Then there is the quantity which is used in laying the dust of the streets in dry summer weather, and which, being soon evaporated by the heat of the sun, cannot in any way serve to swell the volume of the sewage; so that no notice need be taken of it here. Then, again, there is the proportion which is applied to the watering

* This estimate is borne out in the following manner:—The average width of the London streets may be taken at 10 yards; hence each mile run of roadway would contain 17,600 square yards, or just upon three and two thirds statute acres; and consequently 2,500 miles of such streets would occupy 9,150 acres, or rather more than 14 square miles, which is just about the eighth part of 115 square miles, the entire extent of the metropolitan area. The area occupied by the houses, on the other hand, is computed as follows:—The average number of houses to the acre throughout all London at the time of taking the last census was 6. There are 4,840 square yards to the acre, dividing this, then, by eight, we have 605 square yards for the space covered by the entire six houses, and this would give an average of just about 100 square yards for the extent of ground covered by the premises in connexion with each house.

of gardens, and which being at once absorbed by the soil and the plants, cannot possibly make its appearance in the sewers. These exceptional cases, however, form so minute a modicum of the whole supply (amounting as they do to merely a few thousand gallons per diem out of upwards of a hundred millions), that it would be the mere pedantry of statistical precision to attempt to make any allowance for them in the present computation.

The total daily water supply, therefore, may be taken roughly as being the total amount of the wet house-refuse which is discharged every-day into the London sewers; and this may be safely set down, in round numbers, at 120 odd millions of gallons per diem. This quantity includes, of course, all the "slops" of every London household: the refuse water left after scouring, washing, and cooking, the waste from the surplus running of taps, the overflow of cisterns and bursting of pipes, as well as the discharge from private water-closets and public urinals. It includes, also, the refuse streams from the several baths and washhouses, dye-houses, tan-pits, and chemical works distributed throughout the metropolis; and indeed every form of refuse liquid, whether proceeding from the houses or factories of London.

The conclusion, consequently, is, that the only two sources of supply for the metropolitan sewage are the wet street-refuse and the wet house-refuse of the metropolis; that the quantity of the one depends on the amount of the rainfall, or the natural supply of water derived from the clouds, and that of the other on the artificial supply provided by the several metropolitan water-companies; that the average daily natural supply is as nearly as possible tantamount to the average daily artificial supply; that of the average daily rainfall rather less than one-fourth enters the sewers, under ordinary circumstances (the remainder being absorbed by the soil), whereas of the average daily water-supply almost the whole is discharged, in some refuse form or other, into the drains; and, lastly, that the quantity of sewage derived from the wet street-refuse amounts to about 4¾ million cubic feet, or 130,000 and odd tons per diem, whilst that derived daily from the wet house-refuse is not less than 18⅔ million cubic feet, or 550,000 tons.

We must reserve our account of the sewers themselves, or the means of carrying off this enormous feculent flood of refuse, for another number.

"THE EIGHTEENTH CENTURY IN FRANCE."

THEATRES AND COSTUME.

In giving a general notice in our last issue of M. Lacroix's book above mentioned (p. 1052, *ante*) we reserved the right to return to it briefly in connexion with two subjects to which separate chapters are devoted, and which are of more direct interest to us, perhaps, than any of the other subjects treated of. The stage and the art of dress have always had due attention from us, as the two forms in which artistic considerations most closely affect public and private life respectively.

Court influence had thrown the theatre rather into the shade in Paris at the commencement of the eighteenth century. Madame de Maintenon's ill-balanced and acid pietism brought the *Grand Monarque*, who had formerly been a passionate lover of the stage, to a spirit of repentance on this head, and he expiated his former entertainments by having to refuse his attendance at any representations, except such as the semi-religious plays of "Esther" and "Athalie," written by Racine at the request of the high arbitress of court moralities and manners, perhaps as a kind of compensation to his Majesty for the lighter entertainments which he had foregone. The only theatres in Paris at this time were the Royal Academy of Music and the Théâtre Français. The Italian comedy-troupe, who had established themselves at the Hôtel de Bourgogne, had been banished from the city in 1697, under the plea of having satirised Madame de Maintenon. That they must have enjoyed public favour is evident from the recorded remark of the king in dismissing them, that they had nothing to complain of, as "they had come from Italy on foot, and had made enough to return in their carriages." The public followed the example of the sovereign, however, to a considerable extent, and theatres could hardly be said to be popular, though the possession and use of a box at the building in the Palais Royal, where the opera performances of the Academy of Music were held, was rather sought after by the wealthy as an outward sign of their position and privileges, the patronage of opera having been, ever since its invention down to a very recent period, apparently a distinguishing propensity and privilege of the "upper ten thousand."

With the Regency the tide turned in favour of the theatre, and the Italian players were invited or permitted to return; but their language not being familiar to the wealthy *parvenus* who formed then, as always, a considerable support of the theatre, they adopted the native language, and became known as the Théâtre-Italien, which thus disputed preference on equal terms with its three rivals, the Opera; the Comédie Française (or Théâtre Français, for it was called indifferently by both titles); and the Opéra Comique. These were the four Paris theatres of the Regency period and for some time after. The Opéra Comique traces its origin to the fairs at St. Lamont and St. Germain, where comic opera was first played, by permission of the Royal Academy of Music, which seems to have enjoyed a kind of prohibitory *veto* over this performance, possibly by way of stopping anything which might seem likely to trench on its own sphere of serious opera. Under these circumstances the Opéra Comique was developed out of the periodical "fair" theatre.

The Théâtre Français, though not so popular or pecuniarily successful as the Italien and the Opéra Comique, "was still the first theatre in France and in Europe, because it was the highest and most complete expression of the French dramatic art"; and we may probably add that, in its modern edition, it *is* still the first in Europe.

"The company of this theatre scrupulously maintained the traditions of high dramatic art, and was composed of the best actors, both of tragedy and comedy. Entitled to call themselves *Comédiens ordinaires du Roi*, they constituted, as in the time of Molière, an association which had the royal authorisation to manage the theatre itself, all questions of general interest being decided by a majority of votes in this assembly. The adjunction in the reign of Louis XV., of the four first Gentlemen of the Chamber, subjected the Comédie Française, in a certain measure, to the arbitrary authority which, under the Revolution, exercised sovereign control over the internal affairs of this and all the other theatres of Paris. The opinions expressed by these four gentlemen were as good as law, for nothing could be done without their sanction. Not only did they act as arbitrators between the public and the actors, but they also intervened in cases of misunderstanding between the actors themselves; they saw that the regulations in regard to the theatre were carried out, granted retiring pensions, ordered the *début* of a new actor, sanctioned the programme for each evening, and sometimes reprimanded any actor who failed in his task. The finance department alone was left by them to the management of the Sociétaires. In addition to the authority of the gentlemen of the chamber, that of the inspector of *mœurs*, though less meddlesome and harsh, was specially exercised whenever there was to be a State representation; and these regulations lasted till 1789."

Well might the unfortunate actor of that time have exclaimed, like the man who was beheaded in one of Artemus Ward's anecdotes, "We are too much governed." They were, in fact, between Scylla and Charybdis, being subject to the most undisguised and insulting demonstrations of opinion on the part of the audience if they failed to please them, and liable, if they ventured to resent the insults of their critics in the pit, to be imprisoned for contumacy. Many actors of genius and spirit were forced from the stage on this account; among others, Mdlle. Clairon, a celebrated actress of the Comédie Française, who withdrew from the stage when at the height of her powers. Her portrait forms an ornament to the chapter on Theatres, and a noble presence she must have been on the stage.

The admission of spectators on to the stage is a singular anomaly of the old theatre. At the Comédie Française there were seats four deep railed off by an iron balustrade on each side of the stage; and on crowded occasions a fifth row of spectators was permitted to stand round in a semicircle in front of the seats; these were often confounded with the actors, who had to come pushing through their ranks to get on the stage, and whose voices were half-drowned sometimes amid the hum of their conversation. The same kind of thing is referred to by Ben Jonson as common in the great days of our own drama, when it was a special ambition of the *jeunesse* of the day to have the privilege of sitting on the stage, on stools placed about for their use. It is strange to think of the masterpieces of Shakspeare and of Molière going on amidst what would seem to modern eyes such an almost indecorous jumble of actors and spectators. The pit of the French theatre was a formidable institution, too, *circa* 1750. It was not provided with seats, and the spectators, when a favourite piece collected a crowd, were half suffocated in the crush; and what with standing on tiptoe to get a sight of the actors over each other's shoulders, and simultaneously protecting their pockets and holding their canes, swords, cloaks, and hats, it was no wonder if their criticisms were delivered in a somewhat exasperated and exasperating fashion. The pit was surrounded by soldiers to keep the tumultuous mass in order, in which they were not always successful. "The supremacy of the pit, however, did not long survive the placing of seats in that part of the theatre,—a change which was effected in 1782.* It is said that this alteration had an unfavourable effect on dramatic art, and Mercier, amongst others, relates that the pit, when seats were provided, went from one extreme to the other, and from being over-excitable became lethargic and indifferent." This impression of a writer of the day is worth noting, for we might certainly cap it with instances of a somewhat similar tendency in the recent history of our own theatre. There can be no doubt that the old enthusiasm and interest of our theatrical audiences has greatly toned down since the main part of the area of most of our theatres was transformed from the crowded, eager, and not too conventional "pit" to the more spacious, easy, and decorous "stalls." It may be urged that the difference is in the quality of the plays presented; but the remark as to the change in the temper of the French pit when seated is at least suggestive. We know of one important provincial theatre where the attempt was made to do away with the pit entirely, and fill the whole area with stalls, and the scheme had to be abandoned, not only on account of pecuniary non-success, but because the house became so "dead" that the actors complained. The attempt in London, as at the foolishly-named Opéra Comique in the Strand, has never had good results. Among the various schemes for the resuscitation of the drama in England, perhaps we may next hear the proposition to clear away the stalls and restore the old pit, to act as a tonic to the actor and dramatist.

The study of theatrical costume seems to have been in as primitive a state during the first half of the century as the arrangements for the auditorium, the actors being accustomed to dress as they pleased, the only *desideratum* being that the dress should be brilliant and showy. This was really a practical necessity, for the stage, lighted, till 1784, only by tallow candles, was always in a state of semi-obscurity. The reform in the idea of stage costume was initiated partly by Mdlle. Clairon, under whose auspices, on August 20, 1775, Voltaire's tragedy, "L'Orphelin de Chine," was played in Chinese costume, the first tribute to the principle of "local colouring"; though, from the print of one of these costumes for the character of *Idamé*, the result might rather be described as Chinese costume translated into French taste. The extravagance of the stage costume of the period is indicated in the figure of Madame Vestris as *Irene*, in a dress designed at the Théâtre Français; there is a certain superb character about it, too, though the figure seems lost in the costume.

Extravagance, however, was as much the rule in the costume of real life as on the stage. Many happy ideas were struck out which were simply spoiled by being carried to an exaggerated extent. It was a time in which nature, both mentally and materially, was swallowed up and utterly disguised in fashion. In the early part of the century, it is true, richness of dress was discouraged by the Court, Madame de Maintenon setting her face against this as she did against amusement at the theatres, and setting the fashion of sombre tones in dress rather than gay colouring. She is credited, however, with the invention of the lofty head-dresses which, though vanquished by the social edict of Louis XIV. towards the close of his reign, were found in even greater luxuriance at a subsequent period. The comparative engraving of costumes from 1720 to 1740, however, shows nothing more extravagant than we were all accustomed to recently in the days of the crinoline movement. The absurdity of these bell-like dresses is most apparent where they spring out from a tight waist with no attempt at carrying off the abrupt junction of lines; in what is termed the "*Grande robe*," illustrated in the plate by a figure from one of Parrocel's pictures, where the

* The *parterre* in some of the French theatres remained without seats long after this date. This was the case, we can remember perfectly, when in early days we attended performances in the theatre in Rouen.

outer dress, falling from the shoulders without being drawn in at the waist, envelopes the whole body, there is certainly an effect of considerable dignity and sumptuousness produced, of course at the cost of the loss of all "figure." It is remarkable that during the wildest vagaries of female costume the dress of the other sex has generally been at its best; except that it has a little too much of the mere "fine gentleman" cut (which, of course, was in accordance with the social facts of the period), the male costume of the period we are noticing is admirable in the way of elegance and suitability without extravagance. Then when the ladies' costume returns to common-sense, the gentlemen's sinks into insignificance. The only exaggeration noticed by the author against the male costume of the period is in the richness of materials, and the number of very small buttons, used as an ornament, and which in a comedy at the Théâtre-Italien were represented as having become so small as to need a microscope to discern them. The dress of the gentleman was, however, expected to be so frequently changed and renewed that it was a very expensive establishment; and this demand for constant change producing a superabundance of fine dresses, led to the curious result that the lower classes towards the close of the century dressed to a great extent in the left-off clothes of the rich; and it was common for artisans to turn out as dandies in their leisure hours: a sort of amateur levelling up which offers a strange contrast to the tremendous levelling down that was to follow. The women of the middle and lower class seem, however, to have had a more sensible aim in costume, and, in fact, to have represented the good taste of the period; and the Paris grisette was renowned throughout the whole of Europe for the neatness of her attire:—

"Gorgy, in his 'Nouveau Voyage Sentimental' (1785), says, 'The girls employed in shops of various kinds aspire to be classed above the lower ranks of the people; their dress is plain and yet comely, and amongst them is to be studied that sort of coquetry which Rousseau declares to be inherent in the female nature. It does not consist of a quantity of gewgaws which are but advertisements of the wealth of the wearers and the skill of the makers. These women wear only inexpensive dresses, with a little gauze and a few bits of ribbon, but they make the most of them, and produce considerable effect out of very little. Their coiffure is very simple, but it suits them so well that it seems perfect.' This corresponded very closely with J. J. Rousseau's opinions, for, in 'Emile,' he writes, 'Give a young girl who has good taste and sets little store by the fashion of the hour, some ribbon, gauze, muslin, and flowers, and she will make, without the aid of diamonds, laces, and trinkets, a head-dress which will suit her a hundred times better than all the jewelry of Duchapt could do.'"

Rousseau's lesson is, perhaps, not superfluous in the present day; of the species of head-dress which moved his criticism in his own day we have a number of examples given by the author,—specimens that are fearful and wonderful. There was the *loge d'opéra* coiffure (1772), which made a lady's face 72 in. high from the chin to the top of the hair; and the *pouf* coiffure, which was a heterogeneous composition of feathers, jewelry, ribbons, and pins. "Into this wonderful coiffure entered butterflies, birds, painted Cupids, branches of trees, fruits, and even vegetables. On one occasion the Duchesse de Chartres, daughter of the Duc de Penthièvre, appeared at the opera with her hair dressed in a "*pouf sentimental*," upon which was represented her eldest son, the Duc de Beaujolais, in his nurse's arms, a parrot pecking at a cherry, a little negro boy, and the initials worked in hair from the heads of the Ducs d'Orleans, de Chartres, and de Penthièvre." It was in ridicule of this special form of head-dress, probably, that the caricature of "An Attempt to Defraud the Paris Custom-house" (p. 482) was made, in which the officials are represented extracting nearly a cartload of contraband articles from a Brobdignagian coiffure. Another represents a lady with a negro boy in the rear holding her head-dress up with a kind of pitchfork, while she engages in a sentimental conversation with an admirer. Among a score or two of head-dresses figured (pp. 478-9), one represents a ship in full sail on the head; this is called *coiffure à la belle Poule*, but the names seem to have had no connexion whatever with the style or "motive" of the adornment, unless it referred to the name of some eminent ship of the period. One fashion which was prevalent, of introducing stuffed birds in the head-dress, we are sorry to see is being talked of again in English society; it is in bad, and, in fact, rather barbarous taste, and we commend to lady readers the equally pretty and sensible verses of our friend *Punch* on the subject last week.

One thing in which really artistic taste was exemplified was the shoe-buckle; in fact, the ladies' shoemaker under Louis XV. was almost an artist, and his small shoes in every colour of leather, and set off with gold and silver embroidery, with their buckles in gold or cut steel, were as costly as many articles of jewelry. Specimens of some of these buckles, engraved p. 473, are certainly superior in artistic merit to most ornamental work of the period, and there is no article of eighteenth-century costume so elegant in itself, and so indelibly associated with the social history of the period, as the small high shoe with the *talon rouge*.

PROTECTION OF TIMBER IN HARBOUR WORKS, JETTIES, AND PILES.

MR. BRITTON, to whose book on the decay of timber we again refer, says that as the destruction of timber by fungi has been called the *vegetable* rot, it may not be inappropriate to term the destruction of wood by various worms and insects the *animal* rot. The soft woods, and such as are of a saccharine nature in their juices, are the most liable to be assailed by worms; those which are bitter are generally exempt. It is obvious, therefore, that those palatable juices should be got rid of by thorough seasoning, and that the infusion of some unpalatable substance should be injected into the wood, for which those which have a regular grain afford sufficient facilities. The cedar, walnut, plane, cypress, and mahogany are of a nature to discourage the advances of sea-worms, but they are too expensive for general use. The *teredo navalis* is the most destructive of these worms. The Southampton water is particularly infested with it, and Mr. Britton says that it is found in every part to which coals are carried south of the Tees; in the Thames as high as Gravesend; and northward as far as Whitby. It is also found at Ryde, Brighton, and Dover.

About thirty years ago, as nearly as we remember, the late Mr. James Simpson, C.E., was called in by the proprietors of the old Southend Pier, in consequence of piles having been destroyed by marine worms. Mr. Simpson appointed Mr. John Paton to be the resident engineer of the work of restoration, and Mr. Paton afterwards contributed a paper to the Institution of Civil Engineers on the ravages of the teredo and other sea-worms, and became an authority on the subject, and was afterwards employed on sea works in Denmark and elsewhere, and to whom the author acknowledges his indebtedness for much information; and also to Mr. Newport, the eminent physiologist and anatomist, and to M. Forestier, engineer of La Vendée Department, in France.

In a fir pile, taken from the old pier-head at Southend, a teredo was found 2 ft. long and ¾ in. in diameter. These were fir piles, but in oak timber the teredo does not grow to so great a length.

Another kind of worm which is very destructive to timber is the *Limnoria terebrans*. Its ravages were first particularly observed in the year 1810, by Robert Stevenson, the engineer of the Bell Rock Lighthouse. The limnoria resembles a wood-louse, and is hardly perceptible in the timber it attacks, being almost of the same colour. It makes its way into the timber obliquely to the depth of about an inch and a half, the holes being perfectly smooth and cylindrical, about $\frac{1}{10}$ in. in diameter. It attacks most kinds of wood, but teak and green-heart seem to be exempt from it. At Lowestoft Harbour, square 14 in. piles were in three years eaten down to 4 in. square. At Greenock, a pile 12 in. square was eaten through in seven years. The limnoria almost always works just under neap tides; it cannot live in fresh water, and whilst it is destroying the surfaces of a pile the teredo may be attacking the interior.

Another destructive crustacean is the wood-boring shrimp, the *Chelura terebrans*. Its tunnels are made in an oblique direction, not very deeply sunk below the surface, so that after a while the action of the waves washes away the thin shell, and leaves a number of grooves on the surface; after which it again attacks the timber, which becomes in time wholly destroyed. It always swims on its back, and when commencing its work clings to the wood with the legs that proceed from the thorax. It was described by Mr. Mullins, C.E., in a paper read before the Institution of Civil Engineers of Ireland in 1847, to be far more destructive than the *Limnoria terebrans* to the timber piles in Kingston Harbour.

These worms, it is said, do not live except where they have the action of the water almost every tide, nor do they live in the parts covered with sand. It is said that the *teredo* is a native of India, and that it was introduced into Holland some 200 years ago, from whence it has spread through the ports of Northern Europe. The Dutch used to coat their piles with a mixture of pitch and tar, and strew upon them the fine particles of broken cockle-shells, which incrusted and armed the piles against the attacks of the *teredo*.

Another mechanical defence against worms is copper sheathing, but it failed at Southend; for although the piles were covered with it for 9 ft. or 10 ft. of their length, the limnoria not only penetrated between the copper and the timber, but the copper had decayed to such an extent that in some parts it was no thicker than writing-paper. Broad-headed scupper-nails form a better protection, if arranged in regular rows. The scupper-nailed piles at Southend, after twelve years' exposure, were perfectly sound, and although the nails were not driven close together in the first instance, yet the corrosive action was so great as to form a solid impenetrable metallic substance on the surfaces of the piles.

The author gives a list of woods which resist sea worms without any preparation.

Fir, and such timber as we have hitherto mostly used for harbour works, jetties, and piles, have been treated chemically by several processes, such as Kyan's corrosive sublimate, Payne's sulphate of iron and sulphate of lime, Burnett's chloride of zinc, and Bethell's creosoting process; and this latter has proved successful in resisting the attacks of sea-worms. "With regard to the different poisonous compounds having no injurious effect on the worms," the author says, "it should be remembered that all cold-blooded animals are much more tenacious of life than those of a higher temperament, and in descending the scale of animal creation, the tenacity of life increases, and this principle is more developed. A frog, which, though cold-blooded, is an animal of a much higher order than the teredo, will not only live in hydrogen gas, but also in a strong solution of hydrocyanic acid, while at the same time a single drop placed on the nose of a rat, or in the eye of a rabbit, would produce instant death."

The preserving property of soluble salts, such as corrosive sublimate, sulphate of copper, &c., was considered to be founded on their power of coagulating the albumen and the sap of the wood, but that very quality of combining with the albumen destroyed the activity of the poison of the salts.

The *creosoting* process of the late Mr. John Bethell is the injection into the timber of the oil of tar and other bituminous matters containing creosote, and also with pyrolignite of iron, which holds more creosote in solution than any other watery menstruum. The timber used at the breakwaters and piers of Leith, Holyhead, Portland, Lowestoft, Great Grimsby, Plymouth, Wisbeach, and Southampton has been creosoted, it is said, and in no case have the *Teredo navalis*, *Limnoria terebrans*, or any other marine worms or insects been found to attack these works.

Bethell's process is chiefly useful in impregnating and preserving the sapwood; it will hardly penetrate the heart-wood, but the sap-wood being impregnated it prevents the worms reaching the heart-wood; and thus whole round timber is preferred to squared timber for marine work. An almost complete preservation may be ensured by using first Burnett's process of injecting the chloride of zinc into the heart-wood, and afterwards Bethell's process. The author states the quantity of creosote for different kinds of wood per cubic foot, and the cost of the process, and gives in detail the report of Mr. Makinson upon the piles at Lowestoft Harbour, and of Mr. Doswell, who had the conduct of experiments on different descriptions of wood at Southampton, from both of which the great value of the creosoting process for protecting timber in such situations is apparent; and M. Crépin, a Belgian engineer, reported in 1864 upon experiments made at Ostend, that fir timber, well prepared with creosote oil of good quality, is proof against the *teredo*, and is certain to last a long time, resinous wood being easier to impregnate than white fir; and M. Forestier reported to the juries of the French Exhibition of 1867 upon both creosoted and uncreosoted oak, elm, ash, Swedish, Norwegian, and Dantzic red fir, Norway white pine, and plane, and showed that in each case the resistance of the wood, both to bending and crushing weight, was much

increased by creosoting; and that the results of the experiments undertaken by him in the port of Sables d'Olonne fully confirm those obtained at Ostend, and that they all go to prove that the *teredo* cannot attack wood properly creosoted.

ANCIENT AND MODERN EGYPT.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the ordinary fortnightly meeting of this Institute, held on Monday evening, the 29th ult., Sir G. G. Scott, R.A., president, in the chair, the following gentlemen were elected Associates, viz.,—Mr. R. P. Whellock, Vicarage-road, Camberwell; Mr. Frederick Thompson, York-buildings, Adelphi; Mr. Henry Lovegrove, Budge-row, Cannon street; and Mr. Frederick C. Deshon, Norfolk-street, Strand.

Professor T. Hayter Lewis then read an interesting paper entitled "Notes on Ancient and Modern Egypt." He commenced by stating that few discoveries of importance had been made in Egypt since those described by Professor Donaldson, M. Mariette, and Mr. Eaton. The site of Rameses (the treasure-city, and starting-point of the Exodus) was more generally identified with Tanis or Zoan, which theory, if accepted, would completely alter the hitherto-supposed route of the Israelites. After referring to the historical light derived from the study of ancient flint implements, the lecturer described one found by himself at Sakkara, the most ancient cemetery in Egypt. The discovery of the tablet, now in the museum of Boolák, recording the repair of the Temple of the Sphinx, was one of the most important in recent years. It showed the sphinx itself to be far more ancient than the Great Pyramid. Passages in the Queen's Chamber in the Pyramid had been opened by Mr. Dixon and Dr. Grant, and were supposed to have been constructed for purposes of ventilation. Having described some of the statues in the Boolák Museum, which, in point of design and execution, were greatly in advance of the architecture with which they were coeval, Professor Lewis detailed some of his own researches near the great Pyramids of Geezeh. In the vicinity of these structures are many tombs of the old empire, oblong on plan, with sloping sides ending with a level platform. Noticing a hole in one of the platforms, Professor Lewis descended it, and found himself in a chamber some 16 ft. wide. It had a flat ceiling of stone supported on the side walls, and apparently composed of roughly-cast voussoirs, which might be regarded as indicating the elementary principles of arch construction. The remains of Greek architecture in the southern parts of Nubia, though illustrated by Lepsius, did not seem to have attracted so much notice as they deserved. The lion-headed chairs so common in Greek work had probably an Egyptian origin, the ordinary mode of riding in the age of the old empire having been on a sort of seat stretched between two animals. Professor Lewis deplored the wanton injuries inflicted on Egyptian monuments by the rude hands of modern natives, and instanced the tombs at Beni-Hassan, where the mural paintings had been defaced as high as the arm could reach. Having exhibited some specimens of mortar from the stonework immediately under the casing of the great Pyramid, the lecturer said he had examined them by the aid of the microscope, and had found them to be different from all modern mortars and cements; they contained no sand, but minute grains of ground pottery and crystals of selenite. The Coptic churches of Old Cairo were very interesting, and the author said he found no difficulty in studying their beautiful details. The Church of St. Michael (now altered to a Jewish synagogue) is Basilican in character. The altar end has a chancel screen and wall lining enriched with Saracenic work. The secret vessels, crosses, lamps, pulpits, and screens in these churches were of exquisite workmanship. (At this point of the lecture Professor Lewis took occasion to thank Mr. J. D. Crace for the sketches which he had kindly lent in illustration of the subject.) As to the date of these churches, nothing definite is known. In the Rev. S. S. Malan's translation of "Al Makirzi," is described a terrible outbreak of fanaticism in 1002, when the mob pulled down churches and synagogues alike, and 3,000 were destroyed in Egypt and Syria. In 1300 further demolition occurred; but it was subsequently ordered that only those churches which had been built since Islamism had been established should be destroyed, hence the more ancient still remain. El Fostat (now Old Cairo) was founded by the Arabs *c.* 640; the next important part, El Katyë, containing the mosque Teyloon, in 869. But the part best known was founded *c.* 970, and partly reconstructed in the time of Saladin, about 1180, when the Norman architecture in England was giving place to a later style of work. One of the most curious instances of the mixture of Norman with Arab details is in the fine fortress on the road to Heliopolis, Gamarez Zahir. It reminds one of Sicily, where Arab workmen laboured under Christian architects, and both styles are thus mixed. At Cairo these conditions were probably reversed. The chief features of this city are the mosques, many details of which still remain to be described and illustrated. The bronze-work of the great door of the mosque Kaid Bey, 1496, equals, in Professor Lewis's opinion, any work of the kind executed in the Middle Ages. Some of the woodwork and mosaic in the mosques is exquisite beyond description. At Aboo Nasr, the wall-lining is of mosaic, outlined with mother-of-pearl, and the marble floor is bordered with mosaics of intricate patterns. At Kaid Bey the more prominent ornamental parts are raised in strong relief, giving a brilliant effect. Professor Lewis said he visited the Government School Library, where he was courteously received, and allowed to inspect the Arabic illuminated MSS., some of which are superior to any in the British Museum. Adverting to the gradual decline of local taste in architecture, the lecturer said he was unable to say anything in praise of modern works in Egypt. Many of the picturesque features which distinguish the old houses were disappearing, and were supplanted by others of common-place and inferior design. Professor Lewis concluded his paper by describing the characteristics of Egyptian architecture, and showing in what essential respects it differed from the styles by which it was succeeded.

In the discussion which followed,

Mr. Whichcord said it was nearly thirty years ago since he visited Egypt, but when he was there Cairo presented a far more picturesque appearance than, according to Professor Lewis, now characterised it. What struck him (Mr. Whichcord) most was the polychromatic decoration of the houses, somewhat Saracenic in effect. It was the most brilliant polychromy he had ever seen; the red, for instance, was like bright sealing-wax; but the brilliant colours were diffused over the whole of the work in very small portions. Another point that struck him very favourably was the exquisite manipulation of the joiners' work, which was wrought in a firm wood, somewhat analogous to deal, and in very small pieces.

Mr. J. D. Crace, after referring to the strata of salt discovered during the excavation of the Suez Canal as evidence of the Red Sea having flown at different times inland in the direction of the Bitter Lakes, said that Professor Lewis had not alluded to any definitely Roman or Byzantine work in Egypt, although he believed that such did not exist in a recognisable form so low down as Cairo. Near the first cataract of the Nile, however, were the remains of an almost complete Roman city, with a basilica the whole plan of which was clearly traceable. The lecturer had alluded to the bronze doors of Kaid Bey; but there were also some beautiful doors at the Mosque of Sultan Hassan. Professor Lewis had referred to a difference in the appearance of the gold in the initial letters, &c., in Arabic as compared with European MSS. This difference was due to the fact that gold in European MSS. was laid upon a very thick gesso ground, but in Arabic MSS. the gold was almost invariably laid direct upon the vellum or upon the coloured ground. In his (Mr. Crace's) opinion, the most interesting modern art of Egypt was to be found 300 or 400 miles further up the river than Cairo, in some of what might be called the provincial towns, which contained interesting specimens of coloured brickwork, sometimes inlaid with various kinds of tiles. These, and the very curious bond-timber, were quite worthy of illustration by any future architectural traveller to Egypt. As Professor Lewis had incidentally mentioned the Palestine Exploration Fund, it was interesting to know that the committee of that fund were anxious that he should extend his travels to Palestine, where his great knowledge of archæology would be invaluable.

Mr. R. Phené Spiers, in moving a vote of thanks to Professor Lewis for his paper, said he was particularly struck, when travelling in Egypt, with the strong resemblance which a modern block of Egyptian dwellings bore to an ancient pylon. In allusion to the mode in which the building artificer of modern Egypt performs his work, Mr. Spiers said it was precisely the same as that which prevailed in ancient times, as depicted on the ancient monuments. If a quantity of earth or other material had to be removed, a large number of men were employed, each carrying a small receptacle somewhat of the form of a pie-dish,—and he had even seen a cast-off English hat converted to the purpose. Such small receptacles were chosen in preference to hods or barrows, and consequently swarms of men were required. There was no doubt a great deal to deplore in the destruction which was taking place in all the buildings in Cairo. The mode of destroying a building was this: A mosque perhaps had one of its minarets out of repair; it was neglected until, by-and-by, a stone fell off and killed somebody. The whole building was then brought down by the run, and carriages found their way round the heaps of *débris* as best they could, until the stones were gradually taken away one after another. The inhabitants would neither restore the old buildings nor allow any one else to do so. Although their modern art was simply detestable, there was one building in Cairo, viz., the Mosque of Mehemet Ali, which was worth mention, but this owed its merits to its being copied from the mosques of Constantinople. It was, however, fast falling to pieces, owing to the shockingly defective state of the workmanship.

Mr. W. H. White, in seconding the motion, said it was the custom of our fathers to earn the citizenship of the world by visiting Cairo, and describing it as "the most Oriental city"; but now Cairo only appeared Oriental to those who had never been east of Bombay. On entering the city by the Suez Railway, the view of the pyramids was cut vertically by a factory-chimney, as ugly as any Londoner could possibly conceive. The city itself was full of houses with fronts of limestone, many stories high, and there were boulevards under the very foundations of the Mosque of Mehemet Ali; in fact, there was a touch of *ex*-propriation about it reminding one of Paris,—and that touch was very dear to the architect, particularly when he had happened to pass through the Egyptian Custom House, where the hand of *appropriation* was so severely felt. Modern Mohammedan architecture, as seen at Cairo, was thoroughly inferior to the same architecture in North-Western India,—as inferior as electro-plate to solid silver. The bright red sandstone and brilliant white marble which dazzled the visitor to Delhi, and the delicate incised ornament of Ahmedabad, were represented in modern Cairo by paint and plaster. At the last meeting of the Institute, after the reading of Mr. Pullan's paper, some of the members seemed disposed to give up their cherished objections to stucco, but he did not suppose that on the present occasion they were prepared to swallow paint. He wished, with becoming humility, to offer a suggestion to the Foreign Secretary of the Institute; that suggestion was, that the Institute, without relaxing for one moment its extended grasp over Russia and Mexico, should enter into lively relations with some of our brethren in Cairo and its neighbourhood, and also with some of those who practised in the kindred profession, so that when the time came—and it was not far distant—there might be laid the foundation of an artistic intercourse which would be quite as beneficial to both Egyptians and Englishmen as that political intercourse which was inevitable in the no-remote future of Egyptian history.

The vote of thanks was carried by acclamation, and the meeting terminated with the announcement that the next meeting would be held on Monday, December 13, when a paper will be read by Mr. H. A. Darbyshire "On Dwellings for the Poor," with remarks by Mr. C. F. Hayward. This meeting will be special (for members only) for the first quarter of an hour, for the purpose of receiving, *pro formâ*, the report of the special committee on the affairs of the Institute.

New Church, Windsor.—On Thursday, the 25th ult., the memorial-stone of the new church in Bier-lane, Windsor, was laid by H.R.H. the Princess Christian, in the presence of the principal clergy and gentry of the neighbourhood. Her Royal Highness accepted a perspective drawing of the interior of the church from the architect, Mr. Stephen Wyborn, and at the same time expressed her desire to be present at the opening of the church, which will take place next Easter.

SOCIETY OF PAINTERS IN WATER COLOURS.

THE fourteenth winter exhibition of "Sketches and Studies" (so-called, though the majority of the works are really finished drawings) is a very good one. It is true that one or two of the best names are unrepresented; but, on the other hand, we find matter for admiration, both in the Latin and English sense of the word, at the achievements of some of the leading members for what is only an *ad interim* exhibition. Look at Mr. J. D. Watson's contributions, for example. Here are no less than seventeen drawings, all worthy of the artist's reputation, many of them finished works, some of considerable size and importance, sent to this collection of "Sketches and Studies." Such indefatigable zeal is in itself worth note, and its results are no less so. Most of these works present the peculiar style of subject which the artist has made his own,—a nook of landscape, or a corner of a farmstead, with a figure which gives the key and forms the centre interest of the whole. The unity of feeling in these, the intimate relation between the landscape and the figures, both in regard to artistic feeling and scale of tone and colour, is perhaps more complete than in any contemporary work of the same class by English water-colour artists. Of those which illustrate specially this type of excellence may be mentioned "The Dragoon" (92), carrying on a parting flirtation with the dairymaid before he rides out from under the shadow of the entrance-archway; "The Grindstone" (101), a sketch with much power and feeling, where a conversation is carried on between a woman and a man as the former turns the wheel for the grinding; "His youthful Hose well saved" (278), where the state of the said hose is examined by a worthy old couple with the solemnity and insight befitting the occasion. "A Tiff" (192) is a larger study, in thick opaque colour, of two fifteenth-century lovers at the crisis implied; the lady, in a "butterfly" head-dress, turns away from the expostulatory figure who addresses her. The harmony of colour, though sombre, is rich and effective. But the artist has been travelling a little out of his usual route in two or three subjects representing forest scenes, and having a somewhat more extended landscape setting for the figures than Mr. Watson usually allows himself; they are variously named,—"Touchstone and Audrey" (73), "A Dangerous Position" (119), "The Fallen Tree" (366), and one or two others, but the *motif* in all is the same; a woodland scene, with one or two figures in a smaller and less broad style than we are used to from the artist; the two last named are the best; the figures in "The Fallen Tree" are very carefully studied: the lady with the butterfly head-dress appears again here, seated on the fallen trunk, while her companion discourses to her. A small study, really a "sketch," in which landscape interest predominates, "Summertime" (23), is as admirable in its way as any of the larger works.

Mr. Alfred Hunt's contributions are not of importance in comparison with what he can do; "Dunstanborough Castle," "Capel Curig," and "Coniston Old Man" (362, 436, 441), are fine impressive little drawings showing his remarkable power in dealing with evanescent effects of nature. Mr. Albert Goodwin, after having his best works condemned to be "floored" or "corniced" by the hanging committees for some time past, has received the tardy compliment of a line position for a work which does not seem to us at all equal to some former contributions, "Work among the Blue-Bells" (62); it is a peculiar and difficult subject in regard to colour, treated with great care and finish, but deficient in atmosphere and feeling. "Under the Fletchorn, Simplon" (35), by the same hand (one of the "corniced" drawings), shows a gleam of sunlight over the middle distance more vivid and real than perhaps anything else in that way in the room; and an original and brilliant study is that called "Venetian Butterflies sunning their Wings" (80), the butterflies being certain boats whose vividly-tinted sails make broken extensions and reflections of the same tints in the calm waters of the lagune. From this to the open sea is a natural transition, and we find plenty for study in Mr. Powell's sea (156), almost cruel in its cold gleams and driving surf, and noteworthy for the careful drawing and movement of every portion of the water. A little study by the same artist, of "Reflection" (292), should be looked at. Mr. Oswald W. Brierley, who is "marine painter in ordinary to the Queen," justifies the title in one sense by sending nothing at all beyond "ordinary"; and a sea study by Mr. Birket Foster, with the favourite trick of white seagulls against a murky black sky, is a large example of the picture-book style. Miss Clara Montalba is at sea too, a very raging sea, with a quotation from Byron into the bargain (173); there is certainly power in this, yet it is power before which one must put a note of interrogation, for Miss Montalba has the same scale of tone and colour whatever and wherever she paints; her "Thames Mudlarks" (293) is a capital, freely-handled drawing, but there is no "Thames" in it at all. Her larger Thames picture, under the railway bridge at "Blackfriars" (250), shows serious deficiencies in the treatment of architectural detail both in regard to texture and perspective; as to the latter point, look at the pier of the roadway bridge seen in the background.

Sir John Gilbert renders brilliantly and powerfully the general character and costume of a certain type of humanity of a past day, as witness his capital and bold drawing called "Reconnoitering" (11), which has more power and less manner than many of his more finished works; but he seems to fail entirely in realising individual character. His "Hotspur" and "Prince Henry" (in Nos. 27 and 51) are, as ideas of the characters intended, enough to make Shakspeare turn in his grave,—they are like "supers" dressed up for the parts. Among painters of figure-subjects, Mr. Lamont presses to the front, and shows good drawing and character, with very repulsive colouring, in various subjects, of which "Out of Tune" (24) is the best, except, perhaps, "Spring Flowers," a smaller repetition of a work which was, if we remember rightly, in the Dudley Gallery a little while ago, and of which we spoke in praise at the time. Among other contributors of figure-subjects is Mr. E. K. Johnson, whose "Which Hand will You have?" (172), and "For You" (201), are both studies of girls of the would-be-young-lady type in surroundings of garden foliage, in the former case with an utter absence of shadow anywhere, which gives a singularly staring and unreal look to the scene. "The Anxious Mother" (32) (an old hen, namely, following the pretty girl who has taken up the brood in her arms), is pretty, and very carefully finished in every part. There is excellence of a much higher order in the figure subjects by Mr. Walter Duncan, whose "Lovers' Walk" (216), shows two figures in antique and rather grotesque costume parading silently the margin of a stream; in regard to colour and tone there is still more in his "Hundred Merry Tales" (237), apparently a reading from the *Decameron* by a man who leans over the back of a seat where two richly-dressed ladies are seated; whether it is a touch of sentiment, or a shock to her modesty, that makes the younger cover her face with her hand, is not very apparent; the expression of her *embonpoint* companion suggests the latter explanation. The same artist's "Cinderella" (155), which we take to be only a title for a figure study, is very original and striking in expression and *genre*. Mr. H. S. Marks sends a study for "The Bookworm" (168), and two or three other small sketches, whereof "Butterflies" (2) is notable for the complete outdoor effect obtained with little more than grey paper, and the easy and natural pose of the two figures.

A screen is filled with sketches and studies of the late Mr. Pinwell, including a tolerably complete study for perhaps his best work, the "Elixir of Love." In this not only are the disposition and colour sketched in, but the manipulation of some of the carefully-finished faces has been essayed beforehand. In others, the sketches are of the roughest, but quite intelligible in regard to the aim and feeling of each. The manner in which the action of the scene is conveyed is noticeable in such a sketch as "The Cock-fight" (422), where the character in both figures and birds is vividly given, though with mere dabs of colour. "Solitude" (407) is a scene perfect in feeling,—a girl with her back to the spectator gazing at a silent secluded pond,—though only a series of washes; possibly some of the feeling would have been "finished" out of it had it been completed. From the works of this late member to some of those who have lately become members, the transition is not quite encouraging. Of the more recent new members, Mrs. Allingham alone seems to keep her place. It is true this lady's merits have been a little exaggerated, she having the fortune to possess friends among that clique of critics who praise all their personal friends, and no one else; but such drawings as her interior of a scullery with a figure "Peeling Potatoes" (352), and her portrait of "Thomas Carlyle," seated in a garden with a cloak wrapped about him, and a very long clay pipe on the grass at his feet, are excellent in every way as far as they go; in the former the execution of detail is admirable, without any hardness or over-finish. That the artist has a sympathy for effects of another kind is proved by her powerful little sketch of the "Last House in Lynemouth" (240). Of the other recent members, Mr. Clarence Whaite seems to have settled down into a mannerism in the treatment of landscape, the results of which might be described as "symphonies in purple and gamboge" (to borrow a well-known artist's formula); Mr. Brewtnall, whom we suspected from the first of unfortunate leanings to a pretentious eccentricity of subject, has, we fear, stamped himself for good by sending such a production as "Crabbed Age and Youth" (227), a laboured joke, deficient in either humour, sentiment, or sound execution; and Mr. Radnor, whose *technique*, as exhibited again in "Idling" (333), is certainly admirable, as good as any in the room, has yet to show whether he can get beyond mere *technique*. Unless better material for new members is forthcoming, or better judgment shown in their election, the high prestige of the Society will suffer.

Among old exhibitors in the department of landscape who are keeping up their high standard of work, is to be noticed Mr. Dodgson, whose drawings are characterised by certain habitudes of execution which might be called mannerism, were not the aim and style of his work so completely in accordance with a true feeling for, and conscientious study of, nature. "On the Moors, Darnholm" (180), is the best of these. Mr. Edward Duncan's "Arthur's Stone, Gower, South Wales" (56), is a very powerful drawing, which, without being forced in effect, seems to tell from all parts of the room; other drawings by the same artist are of high merit. We must mention also with particular commendation, sundry works of Mr. Charles Davidson, in particular, two studies on "Wray Common" (89, 102), and one at "Red Hill,—Autumn" (224), which latter shows some of the finest and truest qualities of water-colour drawing. Mr. S. Read has a grand subject in "Holburn Head" (232), looking through a stupendous natural portal in the piled-up trap-rock to the distant sea; more might have been made of it; as a mere drawing it is good, but the sentiment seems to have been lost in the handling. Mr. A. P. Newton's "On Corpach Moss" (39) is a small picture made up of green turf, a wildly picturesque shieling, and a rainy sky behind, which is just perfect. Among out-of-the-way attempts may be mentioned Mr. Hale's very bold study of "Loch Broom, Twilight" (40), an indication of an effect almost impossible to realise on paper; and Mr. Jenkins's "Old Town in Sussex, Saturday Night" (37), a street view of a delightful rambling up-and-down old village lighted entirely from the lights in the windows, is an effect very well realised. Other old and well-known members are in their usual force with drawings alike certainly in excellence, but so much alike also in subject and treatment for many years past, as to leave no room for a new word to be said of them. But there is plenty to look at,—more than we have space to do justice to.

THE LIONS AT HOME.

OUR heading is premature, perhaps, for the lions are not at home yet in their new house, but it is nearly ready for them. Visitors to the Zoological Gardens have noticed for some time past the long red-brick erection which has been in progress about a hundred yards from the present rather dilapidated-looking building in which the larger carnivora are lodged. "The new lions' house," which is now complete except in a few details of interior fitting, is a long and not too low apartment, entered by the public in the middle and at each end, lighted along one side with large windows nearly down to the floor, and on the other side bounded (as they say in the geography books) by a row of fourteen large dens. Before the dens runs an ornamental railing with a polished wood capping, to keep the spectators at safe distance, between which and the dens is the passage for feeding. Along the opposite side of the room run three tiers of stone steps for the accommodation of those who wish to get a better view of the animals when the place is full. There is plenty of floor space, however, for as many spectators as are ever likely to be there at one time. The apartment is covered with an open-timber roof, and there are

skylights on the slope opposite to the den side; these, we presume, with the upright windows, are trusted to for regulating the ventilation, as there seems to be no provision for permanent or continuous ventilation except by opening the windows. We should certainly have supposed this would have been requisite, for the comfort of the spectators, if not for the animals who are now to be placed under cover, after having lived so long in open dens.

Opposite to the centre entrance for the public a door and passage lead, between Nos. 7 and 8 of the dens, to the back, where we find ourselves in a passage about 8 ft. wide running the whole length of the building, lighted from windows in the outer wall, and on the inner side showing a long wall with twenty-eight iron doors, in pairs, about 4 ft. from the floor. Each of the fourteen dens has a double chamber, divided across by a transverse wall, between it and the passage, each chamber having a door into the passage at the back, and into the main den in front. Each of the lions' houses, in fact, has three apartments on the ground floor, which by doors of communication can be thrown *en suite* or used as separate apartments. The smaller chambers, we believe, are partly intended as sleeping places in the colder weather, when the animals will be warmer than in the front den, and it will also be easier to make the floor comfortable with boarding or other expedients than in the larger area of the main den. The present dens, which, like the new ones, we believe, have cement on stone floors, have mostly to be boarded over in winter for warmth. But the ante-chambers at the back of the dens are also of use in separating the animals, or getting them out of the way for a time for cleaning and other purposes. The doors are of iron, not very thick, we should say (about one sixth of an inch,—rather less than more), in iron frames built into the wall. Those which open into the passage in the rear are hinged to open outwards, and fastened with a strong pin and staple; those between the "ante-den" and the den are hung portcullis fashion, and are raised and lowered by chains with counterbalance weights, worked from the passage, the chain connected with each inner door hanging down close to the corresponding outer door. The passage has a cement floor, grooved for the wheels of the trolly-cage used for transporting the animals. The method of introducing a lion or tiger to his new habitation will apparently be this,—the trolly-cage runs along the passage, stopping with its door close to the open door of one of the ante-dens. The inner door of this same den would be also raised, and the cage-door being then opened, the animal would naturally walk through to the apparent freedom of the front den, when a movement of the chain drops the inner door, and he is a prisoner. The cage can then be moved away, and the outer door closed and fastened.

The whole of the large dens have also intercommunication right along, by iron sliding doors, moved by a handle and a jointed bar, working through the pier which separates the dens, and kept in its place by a pin when the door is closed. The floors of the dens are laid with cement, with a fall to an iron gutter carried along the front.

As to the architectural style of the house, it is more ambitious than others in the gardens, but we do not think the lions have very much to boast of in regard to the picturesque qualities of their dwelling externally. There is not even the development of sculpture which is to be seen in connexion with the elephant's house, where the bust of the inhabitant is "done in stone" over his door. At the lions' house there is not even a bas-relief; a dull slab of stone only declares prosaically that this is "the new lions' house." It is rumoured, however, that lions are indifferent to the picturesque, and it must be remembered that the lions will not see much of the outside of the building; at least, it is to be hoped not. And we must say that not only are the new dens very much more roomy than the old, which is comfortable for the lions, but they seem very strongly and soundly constructed, which is comfortable for the spectators. The only loop-hole for the lions which occurs to us is this,—that there are no means before opening one of the doors into the back dens from the passage of seeing, first, whether the coast is clear. Of course, it is supposed that the keeper always knows where his lion is, but if he have, from the front, driven him into one of the two back dens and shut him in, may he not afterwards, at the back, inadvertently, or in a moment of forgetfulness, open the wrong door? In such a case an ordinary lion, in fair health, might see his way to make things very lively in the back passage for a time.

IRON VARNISH.

The very important functions which "iron" performs in modern architecture, having in most cases superseded the olden wooden constructions, need no longer be dwelt upon, since they are patent facts to every one. Still, the thorough preservation of its surfaces, consequently of the material itself, remains even at the present day an open question, and we think, therefore, that we may appropriately offer a few remarks on this subject, the more so since it has latterly received the attention of Continental architects.

By far the greater number of the so-called "compositions" having for their object the preservation of iron from oxidation or rusting are mostly composed of resinous or tar-ingredients; it is also perhaps needless to remark that most of these compositions are utterly worthless, whilst some of them are even injurious to iron. Up to the present time, we have not yet succeeded in finding a substance which, under the most sudden changes of temperature, could stick to the iron as well as a well-dried coating of oil-colour. Even in the very limited number of cases in which it is thought expedient and advantageous to cover iron-surfaces with such metals as are less given to the oxidising process, the oil-colour coating offers the *dernier ressort* when the metal coating has vanished with time.

Nevertheless, the iron oil-colour coatings, as prepared at the present day, have their own peculiar defects. It is not so very long ago since the lamented Fairbairn called attention to the fact that iron,—especially in those cases in which it was used for building purposes, where its preservation was of paramount importance,—did not receive the requisite protection from atmospheric influences, and that consequently great care should be taken in furnishing the material with a durable preservative coating.

It is generally known that the basis of all oil-coatings lies with the first coat or groundwork. If the latter is improperly or deficiently applied, then the efficacy of the entire coatings becomes very problematical, even if the subsequent coatings are properly laid on; for in such cases only a combination between the various coatings takes place, which, provided the groundwork does not stick to the iron's surface, soon becomes cracked, and later on shells or peels off. In former times miniums of lead were exclusively used for the ground-colour, and in more recent times miniums of iron, or the so-called "earthen colours," are employed, the chief ingredient of the latter being oxide of iron. Much discussion has been going on regarding as to the greatest efficacy of the two, and it has been frequently asserted that the miniums of lead, on account of their decomposing, caused an injurious effect on the oil-colour coatings. Dr. E. Wiederhold has given much attention to this subject, and has analysed various old iron oil-colour coatings wherever practicable, but he states distinctly that he has never been able to observe a decomposition of the miniums of lead, although he has remarked similar appearances with regard to the destruction of the coating, and the covered metal surface, in several cases in which the grounding was partly performed with minium of lead and partly with minium of iron colour. He thinks, therefore, that we are on the wrong track in seeking the reason why oil-colour coatings do not show the desired durability on iron, and believes that the result desired could be easily attained by a proper consistency of the oil varnish.

Three conditions ought to be fulfilled if the grounding is to be hard and durable, and these are:—

1. The ground coat should possess a good drying quality.
2. It should be a thin liquid; and
3. It should only be sparingly applied.

By a good drying quality, we understand that it should dry better than the ordinary oil varnish, so that the dew which is generally formed towards evening may not form a watery coat on the iron before the ground-colour has hardened, or, at all events, settled on its surface, otherwise a certain emulsion of the varnish takes place which prevents the oil colour from drying into an homogeneous mass. This fact, which has hitherto not received the attention it deserves, is well known in other forms to practical men; so, for instance, when an oil-colour coating becomes sprinkled with water, be it either by rain or otherwise. If the coating of iron is performed in the open air, a watery deposit on the iron surface may also be caused by the material itself. Although the heat-radiating properties of iron, like those of other metals, are insignificant in themselves, still the experiments of Melloni have shown that these properties are considerably increased if the metal surfaces are covered with a varnish coating. It is, therefore, quite possible for iron in such cases to cool down below atmospheric temperature under a cloudless sky.

The ground colour should be thin, so that all inequalities of the metal's surface may be thoroughly passed over and rubbed in. If the necessary care be not taken in this respect, and this may happen very often should the colour be of too thick a nature, then, with the subsequent cracking of the overlayers, caused by the expansion and contraction of the metal itself under changes of temperature, the atmosphere and moisture will gain access through the fissures, and gradually destroy the whole of the coating by rusting or oxidising the metal's surface, besides weakening the latter.

Lastly, the colour should only be sparingly applied, because varnish coatings applied to iron, or other non-porous surfaces, dry and harden very slowly into a solid mass. If the coatings are thickly laid on, then a skin first forms itself in time, under which the colour remains moist. This fact is clearly demonstrated by allowing a drop of oil-colour to fall on a dried painted surface, when the interior of the drop will remain long moist, although the outside appearance of the drop may seem to prove the contrary.

From the preceding remarks it is evident that the ground varnish is the chief component to the satisfactory solution of the three fore-mentioned conditions. We are, we think, not assuming too much in declaring that not a single varnish as at the present day introduced fulfils these three conditions in a satisfactory manner. Quick-drying varnish has hitherto been obtained by two methods. It is either boiled thick, or siccatives are added to it. Thick boiled varnish is, however, of no use for iron-surface coating, because it is impossible for the purpose in view to prepare from such a varnish colour of the required liquidity. Although the consistency of the paint might be greatly reduced to the required pitch by the addition of benzine or turpentine, still the evaporating cold which would be caused by the volatility of these addenda would so lower the temperature of the coated surface as to form a watery deposit on the latter, which would have the same injurious effects which we have already pointed out. An equivalent result is obtained if the ordinary varnish possessing the requisite liquidity is supplemented with siccatives to give it greater drying qualities.

Amongst the various preparations or compositions now introduced for iron or metal varnishes, the best, possessing the requisite drying property, are merely solutions of liquid boiled varnishes in turpentine. It is announced that the fore-mentioned Dr. Wiederhold has succeeded in effecting an improved process for the making of these iron-varnishes, by means of which he obtains an oil varnish of the ordinary liquidity, and retains the specific advantages of linseed varnish, without the admixture of resinous or other strange substances used at the present day for this purpose.

NEW PASSENGER AND CARRIAGE DEPÔT AT ROTHERHITHE FOR THE SOUTH-EASTERN RAILWAY COMPANY.

The South-Eastern Railway Company are erecting an extensive new passenger and carriage depôt at Rotherhithe, on a plot of land upwards of 3 acres in extent, situated principally between the company's main line and that of the London and Brighton Company, immediately opposite the South Bermondsey Station of the last-named company. The area of the new depôt, however, extends beyond the piece of land just named, and is connected with another piece of land having its frontage to the Rotherhithe New-road by lines of rails passing under several of the arches of the London and Brighton line, at a low level. On one portion of the land a large carriage-shed has been erected. It is 340 ft. in length and 112 ft. in width, consisting of two bays, each 56 ft. wide. Eight lines of rails have been laid down within the shed, giving storage-room for about 500 carriages. The roof of the shed is supported in the centre by 24 strong iron columns. It is formed of wood on each side, with a large proportion of glass in the centre,

for light, and is also further lighted on each side by twenty arched windows, 16 ft. in height. The extreme length of the depôt is upwards of 900 ft., and its width 600 ft., and on this area sixteen lines of rails have been laid down, several of the lines on the south-west side passing under the arches of the main line of the Brighton Company. On a portion of the site a station-master's house and offices, together with a telegraph and general offices, are intended to be erected; whilst that part of the land fronting the Rotherhithe New-road, on the north-west side of the Brighton line, is intended to be appropriated to carriage-building and repairing, for which purpose carriage-building premises, including machine-shops, engine-houses, and other structures of a like character, will be erected. The large carriage-shed before described will be utilised for the storage of the carriages engaged in the company's traffic, which will to a great extent be brought to it when the day's train-service is over, and it will likewise be further used for the purpose of making-up excursion and other special trains. When the depôt is completed the intended enlargement of the Bricklayers' Arms Station will be commenced. The buildings on that part of the station formerly used as a passenger-station, and since used for the storage of carriages, will be taken down, and the site added to the goods station, in addition to the 4 acres of land which have been acquired for its enlargement.

THE EUROPEAN ARTISAN IN GREECE.

THE usual daily routine for a European artisan in Athens, if he be a bachelor, is to take a cup of coffee with some bread on rising in the morning. At noon a meal is put before him consisting of soup with bread, of boiled beef with one vegetable, and of one other dish. The butchers' meat is not of a very nourishing or of a very tempting quality, but a person boarding at an hotel, for a fixed sum per day receives at a meal a sufficient quantity of food to satisfy his appetite; the market supplies vegetables, including spinach, cauliflowers, tomatoes, onions, potatoes, and French beans, in abundance; fruit likewise in great plenty, including grapes, apples, pears, melons, oranges, and figs; whilst wine is within the reach of all classes at a very cheap rate, a quantity rather less than a pint being as a rule supplied at each meal to each person. The European artisan, after an abundant midday meal such as indicated, resumes his work until nearly sunset, when he returns to his eating-house for another meal of one hot dish with bread and wine.

The demand for skilled labour in Athens is that of a city of about 50,000 inhabitants, having a port (the Piræus) containing about 10,000 more, and an out-port (Ergasteria) where 2,000 workmen are employed. There is also the flourishing port of Syra, at which town of 20,000 inhabitants many wealthy Greeks permanently reside, and which an artisan established at Athens could reach at the cost of 6s.

Native Greek skilled labour is greatly inferior in almost every branch to the average English, French, German, or Italian labour in the corresponding branches,—the departments in which Greek workmen show most skill being stone-cutting and shoemaking. The Greek population are, however, for the most part essentially a poor community, and are not accustomed to any higher style of workmanship than that which Athens presents. Thus the great majority of persons prefer indifferent native workmanship to greatly superior foreign skilled labour, provided the former can be procured for less cost. It would, therefore, appear to be scarcely worth the while of such British artisans as may not be able altogether to distance native workmen in the quality of their work to come to compete with them in Athens, unless, indeed, the Englishmen be prepared to accept the same amount of remuneration as is given to Greek members of the same crafts. It would not, for instance, be worth the while of an English shoemaker or mason to come to exercise his calling at Athens unless he can see his way to benefiting himself by accepting the prices given to a Greek shoemaker or Greek mason.

The Greek cabinet-makers, masons, carpenters, and painters earn from 3s. 4d. to 3s. 9d. a day,—the painter during August and September earns 5s. 6d., the latter being the month when people enter their newly-rented houses, and consequently the one during which the demand for the finisher is at its height.

The expenditure of a Greek mason averages about 20s. a month,—that is, 2s. for lodging (some six or eight men of this class occupy the same room), 13s. food, 3s. clothing, 6d. washing, 1s. 6d. extras. The expenditure of an average Greek artisan is somewhat higher, and may be estimated at 38s. a month; that is, 6s. 6d. for lodging, 22s. for meals, 6s. 6d. for clothing, and 3s. extras.

On the other hand, it would cost the average European artisan (not English) resident in Athens, to live, 3*l.* 4s. 8d. a month; lodging, unfurnished, per month, 5s. 8d.; meals, 42s.; washing, 8s. 6d.; clothing, 5s. 8d.; pocket-money, 2s. 10d. With reference to English artisans the following estimate would in most cases be found near the mark. Cost of furnished room per month, 20s.; food, 2*l.* 15s.; washing, 7s. 6d.; pocket-money, 3s. 6d.;—total, 4*l.* 6s., in addition to which sums are to be considered the following items,—cost of one suit of clothes a year, 35s.; three pairs of shoes, 33s.; linen, &c., 38s.; socks, handkerchiefs, &c., 37s.;—total, 7*l.* 3s. With extras the total expenditure would amount to about 5*l.* a month.

The experience of married workmen is to the effect that the expenditure of a man living with his wife in his own rooms need not be very much in excess of that which an unmarried man incurs by boarding at a small hotel. An unfurnished room may be hired for 8s. 6d. per month; the wages of a servant would be about 12*l.* a year; and the boarding of three persons in a house would not probably exceed in cost the amount paid by one person for his board at a hotel. Indeed, the average expenditure for the provisions consumed in a merchant's house by himself and two servants is usually set down as 4s. a day.

As to the amusements or means of recreation which Athens holds out to an English artisan, there are but few indeed. During the months of June, July, August, September, and October, the sun is so powerful as to render open-air exercise almost intolerable unless taken in the morning or evening; and the only apparent recreation for the artisan is to frequent one or other of the *cafés chantants* at night, there to drink beer and listen to German instrumental and vocal music. In the winter months there is a performance at the theatre alternately in Greek and French or Italian. English artisans arriving in Greece would find a language strange to them spoken, and, with the exception of a few engineers connected with the railway, they would find scarcely any of our countrymen.

There are at Athens, or in the neighbourhood, a not very large number of French, German, Italian, and English workmen employed, either in connexion with the Piræus Railway, with the Athens Gasworks, with road-making, and one or two other undertakings. The Englishmen are chiefly men skilled in making or working machinery. At the lead-melting works of Laurium, or Ergasteria, there are about 2,000 workmen employed, of whom 80 are foreigners,—French, Italians, and Spanish. The Spaniards receive as miners, 6s. to 6s. 8d. a day; the Frenchmen and Italians, as overseers and artisans, rather less, whilst the living of all costs 2s. a day. The native workman earns about 2s., and lives on about 8d.

The demand for English labour would seem to be only for men skilled in making, managing, or repairing machinery, and for locksmiths, bell-hangers, house decorators, sign-painters, and cabinet-makers. As to the quality of the workmanship in Athens, that can be estimated from the following account of house-renting, which is both interesting and instructive. When a year's house-tenure begins, it is so shattered and disfigured as to be, in the English sense of the word, uninhabitable, until it has undergone a thorough repair from the roof downwards. Yet at that particular time there is so great a demand for house-painters, glaziers, door-handle setters, that the new tenant is forced to go to an hotel, there to live for two or three weeks after possession of the house has been given up. In one case a tenant had to expend 10*l.* for the decoration of a set of rooms which he rented at 72*l.* a year, this being in addition to the amount expended by the proprietor for what he called "putting his house into a state of thorough repair." With the first rains, however, the water came in in streams through the ceilings of two rooms, as well as through that of a staircase, and the window of a passage, thus leaving a great part of the painter's work to be done over again. The windows of the rooms alluded to, in common with those of almost all Athenian houses, are very far from excluding rain when wind and rain play together upon them; and as the Venetian-blinds do not fit their frames, the result is that, on the occasion of each high wind, one or several panes of glass are broken. The occupant of these rooms requiring the wire which pulled a broken water-pipe reset, had to send to a French pipe-layer six times before the latter could find leisure to execute a piece of work which the person who had to pay for it at the rate of 18s. considered would have been overpaid for at 6s. elsewhere.

As to the means of obtaining furniture, the possessor of empty rooms has to purchase at sales, when these occur, such articles as may be presented, without regard to his taste or to their corresponding with each other. The German cabinet-maker is often unable to execute an order for months. The members of the consular body have, in a great measure, to furnish their houses from abroad, but they would of course prefer to employ upholsterers and cabinet-makers for the purpose in Athens, if they could find men capable of supplying their wants, which they cannot do.

The general diffusion of education in the Hellenic kingdom seems to stand in the way of the quality of skilled labour becoming improved. Education, in all its elementary branches at least, costs in Greece little or nothing, and the consequence is that thousands of men who, under other circumstances, would take their places in the ranks of productive industry, think themselves fitted for some more intellectual calling. And the result is that, whilst every deputy in the representative chamber, and every member of the Government, is notoriously besieged by a host of applicants for even the least remunerative public posts, the labour market has to be largely supplied from Crete and elsewhere in Turkey.

STAMPS ON CONTRACT PLANS AND SPECIFICATIONS.

ARCHITECTS have been in the habit of preparing memorandums of agreement for small works, to be executed under hand only, and using thereon the sixpenny adhesive stamp, but stamping the agreement only, and not the plans and specification which are referred to in the agreement as "the plans and specifications exhibited herewith, and marked respectively A and B." It is now said by some that the unstamped specifications and plans cannot be received as evidence in a court of law without the payment of a penalty of 10*l.* Having been asked if it be necessary that the plans and specification should be stamped, and, if so, should every plan be stamped, seeing that, although they form a series, they are drawn on separate sheets of paper, and are not usually fastened together, we submitted the question to the Board of Inland Revenue, and are enabled by their courtesy to append the following reply:—

"Inland Revenue, Somerset House,
London, W.C., Nov. 27, 1875.

Sir,—In reply to the inquiry contained in your letter of the 15th inst., I am directed by the Board of Inland Revenue to inform you that if the specification and plans therein mentioned are fastened together, and annexed to the agreement under hand to which you refer, they are covered by the sixpenny stamp on the agreement.

If they are fastened together, but not annexed to the agreement, they would require an additional sixpenny stamp; and if they are not fastened together, each separate document would require a sixpenny stamp.

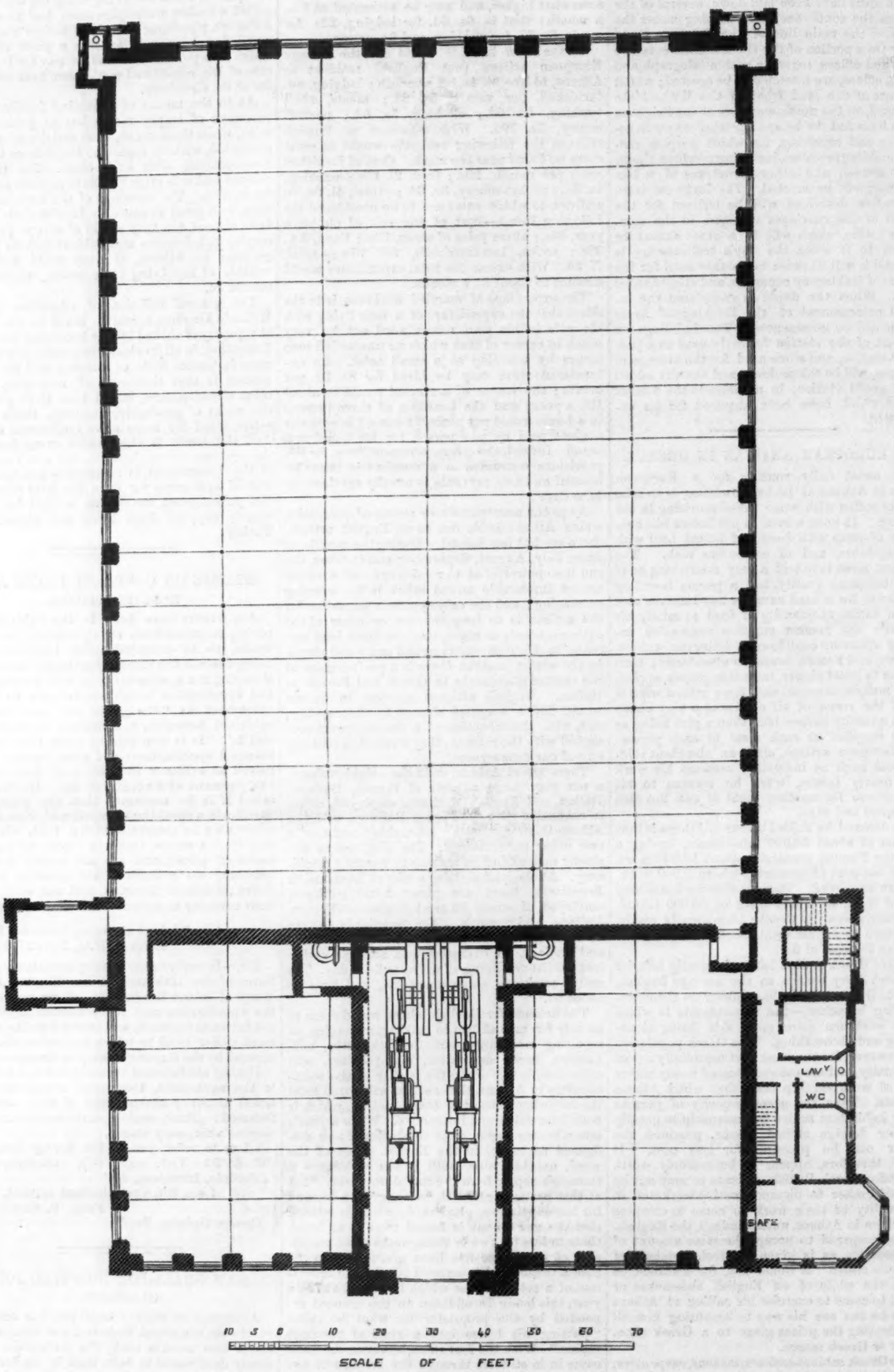
I beg to refer you to the Stamp Act, 1870 (33 & 34 Vict. cap. 97), schedule,—Tit., 'Schedule, Inventory, &c.'

I am, Sir, your obedient servant,
FRED. B. GARNETT.

George Godwin, Esq."

NEW SMALL-POX HOSPITAL FOR GLASGOW.

ALTHOUGH no case of small-pox has occurred within the municipal boundaries of Glasgow for about two months back, the authorities have wisely determined to take time by the forelock, and to make more adequate and satisfactory preparations for any possible epidemic by the erection of a new small-pox hospital at Belvedere, outside the city, and in the vicinity of the Fever Hospital. At present small-pox patients are treated in the existing hospital in Parliamentary-road, the centre of a crowded locality, and this



THE UNITED MILL, OLDHAM.—*Plan.*

has given rise to considerable public discussion. Although these complaints resulted in preparations to erect a new hospital, the old building will be maintained in the event of its being required for any future emergency. The new hospital at Belvedere, to the south-east of Glasgow, and on the banks of the Clyde, consists of five pavilions, which are already partially erected, and which run north and south, with frontages to the east, and intervening spaces of open ground. Each pavilion is divided into four wards, two for acute cases in the centre—having no communication except from the outside—and two for the convalescents, one at each end. There is a total accommodation of 110 beds for acute, and fifty beds for convalescent cases. Nurses' rooms are attached to each pavilion, the necessary offices being approached from the entrance halls. In constructing the pavilions, which are almost entirely of brick, the outer wall is made 14 in. thick, and is followed by an inner air space which is secured by a second or internal wall 4½ in. in thickness. The object of this plan, which is adopted throughout the building, is to prevent damp penetrating from the outside. A current of air is introduced through gratings placed a little above the ground level, and escaping by smaller openings near the roof. Means have been adopted not only to prevent water rising from the foundations up to the walls, but to keep surface water from running into the foundations. The most approved sanitary principles have been applied to all the internal arrangements. Hot-water pipes have been carried round the building, and by appliances in each ward the temperature can be easily regulated. Ventilating appliances rise from the centre of the ceiling, and in addition, an iron ventilator, the spaces of which can be opened and closed at pleasure, is so placed near the apex of the roof of each ward that the vitiated air is drawn into the chimney. The roof is of iron, with wooden purlins, and lined with dressed flooring, while outside, between the woodwork and the slates, is placed a lining of felt cloth, for the prevention of damp. The floorings will be laid with oak. To the south-east will stand a large and commodious washing-house, while the matrons' and medical superintendent's houses, and dormitories for the nurses, to the number of forty, will occupy a position at the north-east corner of the grounds, close to which will be the morgue. There will be a large kitchen opposite the north end of the central pavilion. The main lodge will stand fifty yards off the London-road, communication being afforded by a wide spacious street, on either side of which a shrubbery will be planted.

The cost of the new hospital, it is estimated, will be upwards of 22,000*l.*

DWELLINGS OF THE DAMASCENE WORKPEOPLE.

THE Damascene artisan or handicraftsman can obtain a house of four or five rooms for 5*s.* to 15*s.* a month, built of a composition of mud and pebble. It is conducive neither to health nor comfort, with low roofs, situated in narrow dirty lanes, exposed to heat in summer and to cold in winter, without any attempt at scavenging or other sanitary precautions,—no furniture worthy of the name,—the life of the inmates is, indeed, very miserable; but neither better nor worse than that of their fellows in other purely Oriental cities.

The artisan's average wages are from 2*s.* to 2*s.* 6*d.* a day, according to the importance of the occupation in which he is engaged. His diet consists of fruit, vegetables, rice, oil, and bread. Meat is to him a luxury to be indulged in only on rare occasions. The luxuriant vegetation of the plains, however, enables him to obtain the necessaries of his existence at a very low cost, and leaves him a margin for rent and clothing and other expenses.

The assistants and labourers in the various trades earn from 1*s.* to 1*s.* 6*d.* per diem. The means at their command necessarily imply a mode of life far inferior to that followed by the master workmen as far as regards food, clothing, and lodging. If the labourer be a Christian, and unmarried, he shares a room with others of his fellows in a like position. If married, he has a room to himself, for which he pays next to nothing. His furniture is a rug or an "abba," a mat, a few crockery utensils, and his bed,—a mat in summer and a rug in winter. A moslem of this class, if unmarried, lodges in the khans, where the accommodation costs ½*d.* or 1*d.* a night. His food is obtained at one of the many cheap cookshops with which the city abounds.

The Damascene workman is an effeminate creature, contented with his lot, of no ambition. Happy when he has gained a few piastres, he shuts his shop and betakes himself to the gardens or the coffee-shop, where he whiles away his time until the exhaustion of his little profit warns him once more to return to work. Even if he be engaged in one of the trades paid by the job, he still preserves his apathetic, listless aspect, and continual supervision is necessary to make him perform his work within a reasonable time.

The superior articles of Damascene workmanship, for which this city was formerly renowned, are now seldom produced. The silk trade, once the chief support of Damascus, has, in consequence of heavy imposts, dwindled down until its productions are sufficient only for local wants. The rich carvings and gildings, mosaic work in marble, stone, wood, and glass, and the various intricacies of the stalactite and the honeycomb style of ornament with which the rich Damascenes were wont in better times to adorn their houses, are giving way to simpler and less costly modes of decoration. Many of the old native manufacturers have had to yield to foreign competition, and they are, consequently, confined to those articles which, by their inferiority or insignificance, have not invited rivalry on the part of the Western workshops. The agricultural portion of the inhabitants have a direct interest in the working and produce of the ground they till, the land in the neighbourhood being farmed on the share system. The class of farm-labourers is, therefore, almost unknown. The peasant lives in a mud-house; his furniture, a few pots of earthenware; his bed, a mat; his clothing of the coarsest native manufacture; his wife adds by her spinning to the household comforts; his fire is fed in winter by Indian corn-stalks and almond-stones; his light is produced by the oil of the castor-plant; his food is of the most primitive kind, and is entirely raised by his hand: barley and pea-bread, with fruit and vegetables, being his sustenance.

FLOODS AND BRIDGES.

THE recent floods have perceptibly told on the bridges in several counties, and those streams that have tidal currents appear less subject to damaged bridges than those rivers that merely flow into the sea and drain large surfaces of land.

The county of York is a great sufferer from the floods; and, somewhat suggestive appears to be the fact that the more ancient the bridge the stronger the structure. As an instance, one of the oldest bridges in England is the stone structure over the River Wharfe, at Tadcaster, and the volume of water and its torrent have been something grand and terrific, yet the stout old bridge is, apparently, as sound as ever.

At Malton, last week, the authorities met to take into consideration the damage done by the floods which had prevailed in that district during the past few weeks. A deputation waited upon the Board to complain of the great inconvenience and trouble felt by the residents in one part of the borough of Malton through being shut off for five days from direct communication with the town of Malton, the road leading to their part of the town being unpassable for the flood.

Captain Copperthwaite, one of the directors of the North-Eastern Railway Company, then called attention to the insecure state of the county bridge connecting the North and East Ridings, and spanning the River Derwent at Norton, which has been so much affected by the floods as to be positively dangerous, although considered a massive stone structure. The foundations are so weakened that it is expected an entirely new bridge will have to be constructed; and though the re-erection is a matter for the consideration of the two Ridings, it was necessary to take action without delay.

Mr. Seth Tinsley, builder, said that when the flood was at its height, he was upon the bridge, and distinctly felt the structure vibrate.

The bridges in the county of Durham have also undergone a severe shaking; and the River Wear was dangerously swollen: the flood eventually brought down a bridge near the city, and which spanned the River Dearness.

The north side of the east abutment, near the North-Eastern Railway viaduct, had the foundations washed out, and the parapet wall and other masonry fell into the water beneath. A portion of the arch came away with the subsiding abutment, but the rest of the structure remains.

The inconvenience and loss sustained by this damage to bridges all over the country has at least proved to the public the inestimable value of good bridges, and those who construct them.

UNITED MILL, OLDHAM.

OLDHAM has long been celebrated for the extent of its cotton manufactories, and for a considerable number of years has taken one-third of the cotton produced throughout the world. Here also co-operative enterprise has been pre-eminent, but during the early part of 1874 an extraordinary movement in this direction took place. From thirty to forty new companies (all under the Limited Companies Act) were projected, and so great was the mania for buying and selling shares, that the share-list of a new company opening in the morning was in some instances closed within a couple of hours, having obtained applications for the requisite amount of capital,—generally from 60,000*l.* to 80,000*l.*

The mill illustrated in our present number is one of these emanations from co-operative enterprise. The share capital is 80,000*l.*, in shares of 5*l.* each, and although the office was only open during one day for share applications, the value of the stock applied for amounted to between 300,000*l.* and 400,000*l.* The title given to the company arose from the fact that the Board of directors was chosen from the united Boards of various limited cotton-spinning companies. The mill is 80 yards long by 43 yards wide, and is practically of six stories in height, one portion of the cellar being 14 ft. high.

The construction of a cotton-mill, as here shown, is that of a large rectangular building, divided into bays of suitable dimensions by vertical cast-iron columns, which support transverse beams, also of cast-iron. These latter carry wrought-iron joists placed about 3 ft. 4 in. apart. From the flanges of the wrought-iron joists are sprung segmental brick arches, filled up and levelled at the haunches with cement concrete, upon which is placed the boarded or flag flooring, as required.

The building, when ready for the reception of the machinery, will have cost about 50,000*l.*; and, including the latter, the cost will reach to about 130,000*l.*

The contractors for the erection of the mill are Messrs. Robert Neill & Sons, of Manchester; for lodge making and foundations, Messrs. S. Dunkerley, Son, & Co., of Oldham; the engines, of 400 horse-power, are by Messrs. Pollitt & Wigzell, of Sowerby Bridge, and the piston speed will reach 600 ft. per minute; the boilers are supplied by the Fairbairn Engineering Company (Limited), of Manchester; the economisers are by Messrs. Green & Son, of Wakefield and Manchester; and the machinery is by Messrs. Platt, Brothers, & Co. (Limited), of Oldham.

Mr. Thomas Mitchell, of Oldham and Manchester, is the architect. The supervision of the work is under Mr. John Handford, clerk of works.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

SESSION 1875–76 of this Society will commence on December 9th, when the President, Mr. W. F. Butler, A.I.C.E., will deliver an opening address. The following is the syllabus of papers for the Session:—

Dec. 23rd, 1875.—"London Bridge and its Traffic." By Mr. A. T. Walmisley, C.E.

Jan. 13th, 1876.—"Trade Unions." By Mr. Charles H. Bew.

Jan. 27th.—"The Testing and Strength of Materials." By Mr. R. M. Bancroft.

Feb. 10th.—"Permanent Way of English and Foreign Railways." By Mr. W. C. Street.

Feb. 24th.—"Aquaria and their Construction." By Mr. C. H. Driver, architect.

March 16th.—"The Hoarworthy Bridge over the River Wye." By Mr. C. W. Whitaker, C.E.

March 30th.—"Concrete Flooring." By Mr. Alexander Payne, architect.

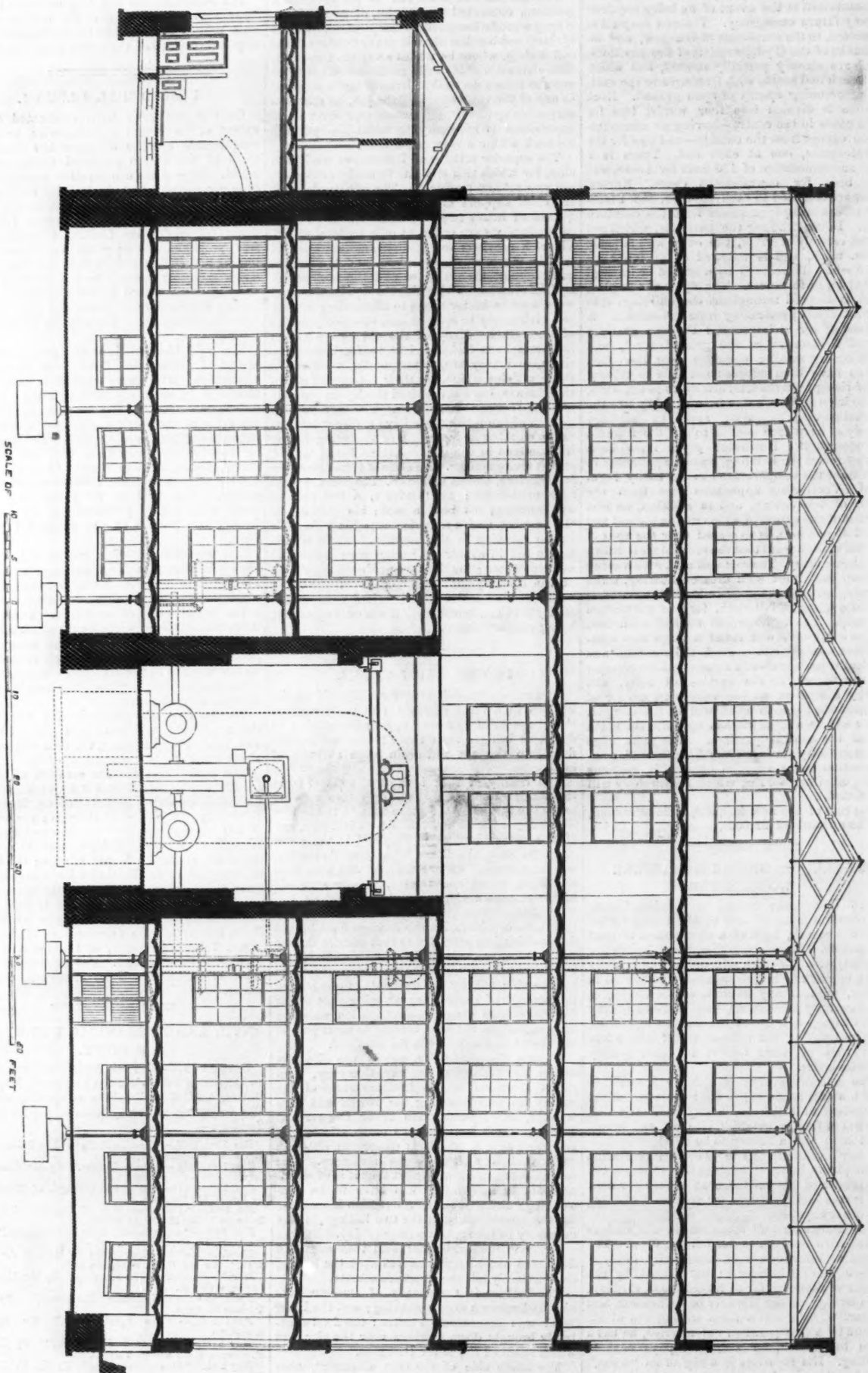
April 13th. — "Hydraulic Machinery." By Mr. Thomas M. Gray.

April 27th. — "The Spectroscope." By Mr. B. Haughton.

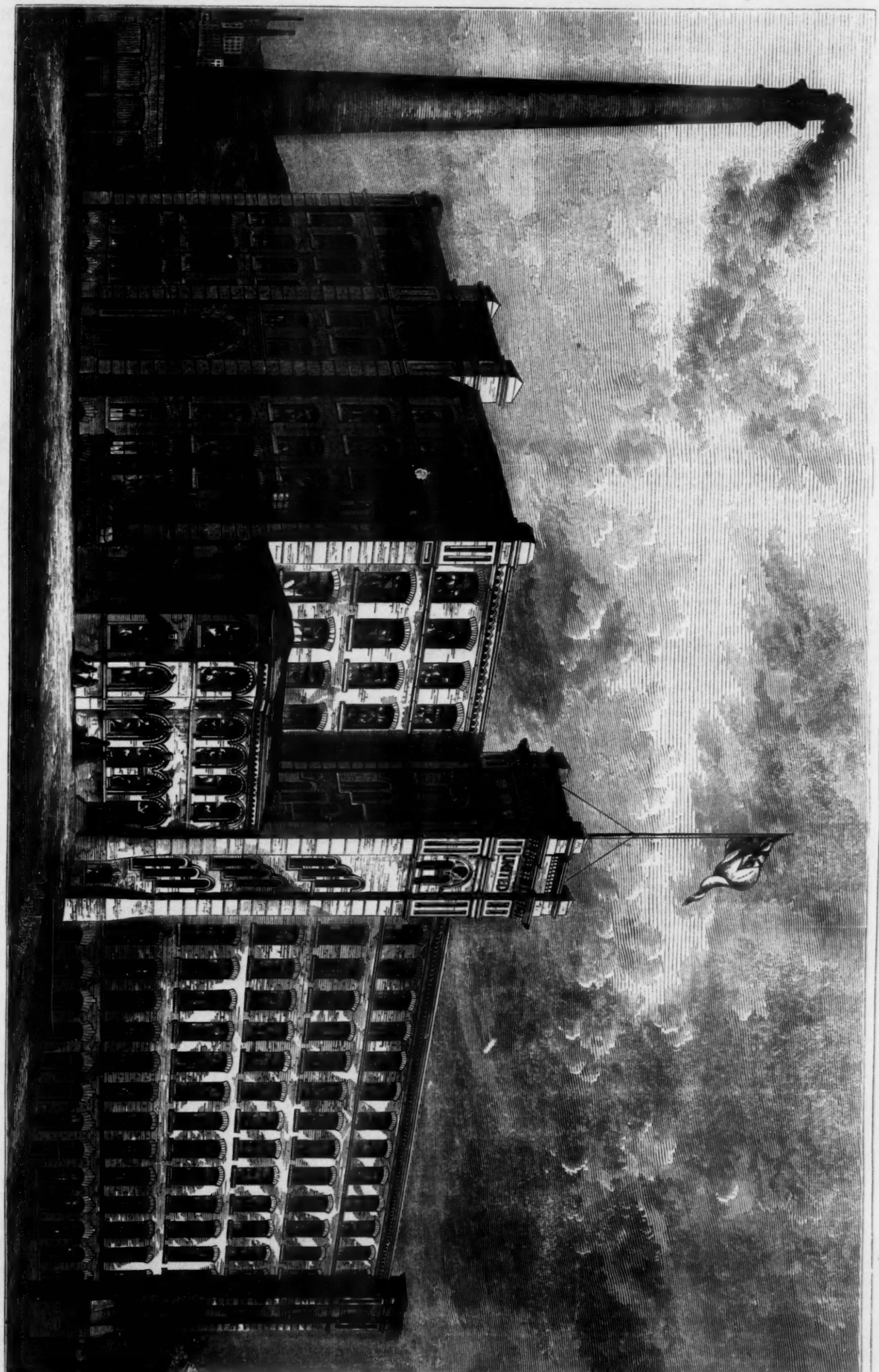
May 11th.—"Railway Rolling Stock." By Messrs. P. Burrell, C.E., and H. Valpy, C.E.

May 25th.—"Steam Tram Cars." By Mr. E. Perrett, C.E.

The annual meeting will be held on June 15th. Visits to various works in progress will be made during the session.



THE UNITED MILL, OLDHAM.—*Section.*



THE UNITED MILL, OLDHAM.—MR. THOMAS MITCHELL, ARCHITECT.

A VISIT TO GRESFORD CHURCH AND NEIGHBOURHOOD, NORTH WALES.

THE three finest Perpendicular churches in North Wales are St. Giles's, Wrexham; St. Mary's, Mold; and All Saints', Gresford. Of the former two, detailed notices will be found in the *Builder*, vol. xxxi., p. 809, and vol. xxxii., p. 811, respectively; the following account of Gresford Church completes the Welsh architectural triad.

Gresford is said to derive its name from the four lanes, at the convergence of which the village is built. Another conjecture is that the word "Gres," corrupted from "Croes," a cross, is referable to an immense cross, which stood on the side of the road leading from Wrexham to Chester, and about an eighth of a mile from the village, the pedestal of which,—a large block of stone,—is still to be seen. The derivation of the name is of no moment,—

"What's in a name? That which we call a rose,
By any other name would smell as sweet."

The scenery of the Vale of Gresford is beautiful, with the River Alun winding through it, and the bold background of the Welsh hills, the vale royal of Cheshire, with the old city in the distance, gives picturesqueness to the view.

The great object of local attraction is the church, dedicated to All Saints. The land was given by the six sons of Ithel; and Ithel was the grandson of a lady known in those times as the heiress of Dyffryn, the vale of Clwyd, and who had extensive estates in the townships of Gresford and Allington.

The rectory of Gresford formerly belonged to St. Stephen's College, Westminster, built and endowed by Edward III. It was afterwards possessed by the Dean and Chapter of Westminster, who have sold it to the Ecclesiastical Commissioners.

Rickman says that the church "is a very beautiful Perpendicular edifice, with a lofty tower of fine composition, and deserves careful examination."

The church consists of a nave, with aisles, south porch, chancel, and aisles, formerly chapels, and a square tower at the west end, containing twelve bells, formerly reckoned among the seven wonders of Wales. The dimensions of this church are said to be as follow:—Nave, 73 ft. by 25 ft.; chancel, 37 ft. by 25 ft.; aisles, 85 ft. by 12 ft.; and the chapels, 25 ft. by 12 ft. The nave is separated from the aisles by piers, each pier consisting of eight columns, with moulded capitals and bases, supporting pointed arches, with a clearstory over, having windows with depressed arches, in four trefoiled lights. Quarry lights would much improve these windows, in lieu of the present ugly modern glass. The roof is a low span, of timber, and open, with rafters and tie-beams moulded, and knees with angels supporting shields, resting on stone corbel-heads. The spaces between the rafters are subdivided into squares, with bosses at the intersections. The pulpit stands on the north side of the nave, against a pier, at the east end. It is of an octagonal form, modern, and of Caen stone. The lectern, at the east end of the nave, is of brass, in the form of an eagle with wings expanded. The floor is paved with large red tiles, placed diagonally, with black borders and white angles. Two small white marble slabs in the floor record the remains of Thomas Boydell, of Trevalyn Hall, date 1804; and Margarette Golightly.

In 1867, the west gallery and all the high pews on the ground-floor were removed, and new solid oak benches, with poppy-heads, were introduced. As in Mold church, there is no tower arch, but only the plain side of the tower, and a small pointed doorway, with chamfered arch. On the south side is a mural monument to Elizabeth, widow of John Williams, of Gwersyllt Park, date 1855. On the floor, in front of the above, is a plain marble pedestal, inscribed John Williams, date 1848. On the pedestal is a female figure, kneeling. On the north side is a mural marble tablet, carved, to Anne, wife of Hugh Maxwell Goodwin, of Mount Alyn, date 1842.

The ground-floor of the tower is used as a porch, with a seat on each side. In the side walls are arched recesses, with tombs, formerly containing recumbent effigies. In an upright position are two stone effigies, said to have been removed from the vicarage, where they were located for fifteen years. They evidently were recumbent figures formerly in the church.

The windows in both aisles have obtuse arches. They are in four lights, with cinquefoiled heads, and trefoil-headed vertical lights above, filled with ancient painted and stained glass, said to have come originally from Basingwerk Abbey. The roofs of the aisles are open-timbered, of a low span, with rafters and moulded tie-beams and knees, supported by stone corbel-heads. The floors are paved similarly to the nave. There are vaults under the north aisle, noted by inscriptions on small marble slabs in the floor, to John Madocks, of Vrow-yw and Glanywern, and James Boydell, Rosset. In the west wall of the north aisle is a memorial window to Maria, wife of Patrick Hunter, of Mount Alyn, date 1867.

Of monuments and brasses in the north aisle, there is an elaborately-sculptured stone in an arched recess, having round a shield the words, "Here lies Grouw ap Jorwerth ap Dafydd, whose soul God absolve, 1320." The arms, three mullets on a bend, are of the family of the Ithels. There are also marble tablets to the children of George Shakerley, 1735; Richard Jones, of Llay, 1752; Judith, daughter of the Rev. Robert Porteus, rector of Cockayne Hartley, Bedford, 1820; Hugh Maxwell Goodwin, date 1846; Margarette, wife of Richard Golightly, of Liverpool, 1855. There is also an enriched stone Gothic mural monument to the wife of James Boydell, of the Rosset, 1861.

The organ is at the east end of the north aisle. It obscures one window, and has the appearance of a large horse-box; the pipes are placed on the top, unenclosed, and tattooed. The architect of the original church would have made an ornamental feature of the organ-case. During the Middle Ages, every object was rendered artistic,—tables, stools, crowns, mitres, sceptres, crosiers, and even buckles.

Beneath the central window of the south aisle, in an arched recess, is a tomb containing an effigy of a celebrated warrior in mail armour; on his shield is a lion rampant, and around were formerly the words, *Hic jacet Madoc ap Llewelin ap Gruff, A.D.* 1331. The sides of the tomb are decorated with sculptured quatrefoils in circles with shields, in relief. There are mural marble tablets in this aisle to the Rev. Robert Wynne, D.D., vicar of this parish, date 1707; John Travers, late of Trevallyn, 1748; William Travers, of Trevallyn House, Denbigh, 1765; William Pate, of Crosshowell, 1783; Sir Robert Townshend and his wife, 1790. There is also a brass plate under a memorial window inscribed to Lieutenant Rasbotham, date 1872; and a brass beneath a memorial window erected to Lieutenant Edward Hunter Townshend, by the officers, non-commissioned officers, and private soldiers of his regiment. He died at sea off Cape Coast Castle, Africa, while engaged with Sir Garnet Wolseley; date 1873. There are several other memorial windows.

The porch to the south aisle has an open span roof. The window on each side is square-headed, in two cinquefoil lights. The inner doorway has a depressed arch with label. The floor is paved similarly to the aisle. Over the above doorway in aisle is a mural monument with an open pediment, with a shield in the opening, date 1759. Another elaborate monument is to John Robinson, date 1680. The window at the west end is pointed, in four trefoiled lights, with flamboyant tracery in head, filled with painted and stained glass in memory of George Herbert Wickham, second son of Robert Wickham, M.A., vicar of Gresford, date 1868.

The stone font stands at the west end of the aisle; it is ancient, lined with lead, with water drain, octagonal in form, and enriched with sculptures. It is interesting, and does not appear to have been engraved.

The chancel is one step higher than the nave, and separated from the nave by a screen arched outwards on both sides at the top, forming a rood-loft, still remaining, of considerable beauty. The altar is approached by five steps, and has a large brass rail supported by ornamental standards. The floors of chancel and sacrarium are paved with ornamental glazed and coloured encaustic tiles.

The east window, restored by subscription in 1867, has a depressed arch, in seven cinquefoil-headed lights, with trefoil-headed vertical lights above. The reredos has been removed to Llanfynydd Church, near Hope.

On each side of the altar is a closed window, with a depressed arch; the recess within jambs is now used as a niche. On the north side is a bust to William Egerton, of Gresford Lodge; date, 1827. On the south side is a sepulchral vase on a pedestal, with a very large fat Cupid, nearly the size of the pedestal, pointing to an inscription to John Parry, of Gresford Lodge, date 1797; R. Westmacott, jun., sculptor. The removal of these monuments, and the restoration of the ancient windows, filled with painted and stained glass, would be a great improvement.

There are also mural marble tablets: to George Warrington, date 1770; to the wife of the Rev. George Warrington, 1802; also to the Rev. Henry Newcome, M.A., with a female figure in relief, 1803; and John Boydell, of Roft Castle Cottage, 1839. On the north side of the altar are two brasses, let into the wall, to Lieut. Egerton, of the 2nd regiment Bengal Infantry, date 1841; and to the daughter of Philip Egerton, of Egerton, 1862. On each side of the chancel, placed longitudinally, are ancient carved stall-seats.

The north-chancel aisle, known as the Maddocks' chapel, formerly belonged to an old family of that name, who lived at Llay Hall. In this chapel are mural monuments to William Maddocks, 1749; John Maddocks, 1794; Thomas and Eleanor Hayman, 1810; John Hayman, 1839; and a Gothic monument to John Maddock, 1837. The floor rises one step above the aisle. In the east wall, by the north angle, is a canopied single piscina. The windows are similar to those of the aisle.

The south-chancel aisle is called Trevor's Chapel; the windows are similar to those in the aisle. Beneath the east window is a remarkable and expensive Italian mural monument to John Trevor, of Trevalyn Hall, date 1589. There are three semicircular-headed recesses; the central one is closed, and has an inscription in Welsh, stating that he was interred by his son, Sir Richard. He reclines in armour, the whole length of the three arched recesses; in the left-hand recess are his legs and boots, and in the right-hand recess is his head resting on his arm raised on a cushion, painted life-like! There is also an elaborate monument to Sir Richard Trevor, containing his effigy and that of his wife kneeling, full size, date 1638; and a mural monument to Dame Katherine Trevor, wife of Sir Richard, and five daughters, in relief, all kneeling in prayer, date 1602. There are also modern marble tablets to Julia Boscawen, 1832, and Thomas Griffith, of Trevalyn Hall, 1856; and a Gothic monument to the wife of John Boydell, 1851. At the east end of this chapel is an altar-tomb, with monumental effigies on brass, to Christopher Parkins, curate of this church, and his wife, 1843. This brass, by the Messrs. Waller, exhibits a satisfactory revival of the ancient art of engraving on brass. Beneath the window in the south wall, at the east end, is a piscina with canopy and corbel-heads.

The two chapels are separated from the chancel and aisles by carved oak screens, with open work, and crested on the top.

The new open seats, the paving, and the removal of the paint and whitewash from the panelled ceilings, walls, columns, &c., in the year 1867, cost 2,721*l*. The whole of the church is lighted by coronæ with candles, there being no gas, at present, laid on in the village.

Of the exterior of the church, the tower, clearstory, aisles, chancel, chapels, &c., are all embattled. The tower has a crocketed pinnacle at each angle, with a central pinnacle between, and between each pinnacle the statue of a Knight Templar, eight altogether. In a niche on one side of the tower is a statue of Henry VII. The tower is well proportioned, and the figures harmonise with the pinnacles, so much so, that at a distance they appear like smaller pinnacles. Beneath the embattlements is a cornice and band with quatrefoil panels. The belfry windows have mullions, transoms, and foiled tracery, with canopied heads, finials, and crockets. At the base of the windows is a cornice. About midway is another band, with quatrefoil panels. The buttresses are diagonal, with niches and figures. The lower part of the tower has been supposed to be of an earlier date, the door to be of the Decorated character, also a buttress and window on the north side. The gurgoyles have very large heads. A considerable portion of the tower was blown down about twenty-two years ago, but was promptly restored by the parishioners.

The east end of the chancel is surmounted by a cross, with crocketed pinnacles at the angles, and beneath the east window is a buttress, with a small door adjacent. The cornices of the clearstory, aisles, &c., are decorated with grotesque sculptures and pateræ. The buttresses of the aisles are canopied.

The church is surrounded by an extensive churchyard, enclosed by a palisade. There are some large venerable yew trees. One yew tree

often alluded to, and said to be 1,400 years old, and 26 ft. in circumference, still remains. On the north side are small red-brick buildings, slated, and a school and hospital, founded in 1725. On the south side are school buildings in the Early English style, with buttresses, erected in memory of the late Bishop of St. Asaph," an earnest promoter of education." He died in 1872.

In the immediate vicinity of the village is an eminence called the Roft, formerly a British camp, treble trenched, having at one corner a lofty mount or keep.

A natural phenomenon, petrifying waters, in the parish of Gresford, is spoken of. They permeate the slopes upon the western side of the Alun, for the length of half a mile. The quality of the water is to petrify all the vegetable productions it flows over.

Gresford is a remarkably pleasing village, worthy of a visit independently of its architectectural attractions.

W. Pettit Griffith, F.S.A.

JAPANESE ART AND INDUSTRY.

A small but unusually interesting collection of old Japanese bronzes is now in course of arrangement at South Kensington. They are lent by Mons. S. Bing. Many of the objects bear signs of a very venerable antiquity. One vase is covered, in the upper part, with a pattern that bears a very close resemblance to Chinese writing, although whether it is an actual inscription, or only a decorative pattern, we are as yet unable to say. A teapot in the form of a goose, and a model of a goose which is not apparently intended for anything but ornament, are of a very archaic type. An oblong brass tray, inlaid with silver, is notable for the delicacy of the inlay work. The quaint, varied, and elegant forms of the vases, tazzas, toilet-bottles, and other objects, are worthy of attentive study. There is a bronze tortoise, which the life-like expression of the head and limbs, as well as the aspect of the carapace, seem to warrant as a *fac-simile* portrait, but which draws behind it a flowing tail, more resembling the skirt of a lady's dress than anything with which we are familiar in chelonian life, or, indeed, in any part of the animal kingdom. There is a narrow embossed vase in black bronze which might be almost thought to be a fine casting in iron. This should be compared with the beautiful green hue of a nondescript retort-like vessel, in the form of a distorted gourd, which looks like malachite without the veining, but which is really bronze. This object, however, is said to be Chinese. The various forms of incense-burners also deserve attention, and so does the curious Kaya porcelain, exhibited by the Rev. F. H. Morton.

Highly interesting as this small collection is, it is likely to be outshone by a display which is in course of preparation for the Bethnal-green Museum. This includes Japanese objects of every possible kind, and will not only illustrate the arts of this curious people, but throw much light on their domestic, social, and industrial habits. We understand that it is intended to open this collection to the public in January next.

THE WHITEFRIARS THEATRES.

Will you allow me to add a few notes to the description of the Whitefriars Theatre which appeared in the *Builder* of the 13th ult.? These notes are taken from my "Memorials of Temple Bar, with some Account of Fleet-street" (published in 1869), p. 98, and while giving a summary of dates connecting the history of the Whitefriars and Salisbury-court Theatres, they added (at the time of publication) new and unpublished items of interest in connexion with these once popular playhouses.

The earliest theatre appears to have been established in the old Monastery Hall, and it may be a new fact to many of your readers if I add that the reason why the earlier playhouses were opened within the monasteries of the Black and White Friars was that these sanctuaries were out of the jurisdiction of the Lord Mayor and Corporation, who from the earliest to the present time have been opposed to theatrical performances within the City. The "Whitefriars" must have been opened shortly after that at Blackfriars in 1576. Mr. Collier says it was fitted up in 1586 and taken down in 1613, and that a survey of 1616 mentions it to have been used as a playhouse for thirty years; while Field's "Woman is a Weathercock," acted before the king and privately at the Whitefriars (printed 1612) was the first, or one of the [first, plays acted there after the removal of the king's servants from Blackfriars.

I find the wardmote inquest of St. Dunstan's presenting, in 1609, "one playhouse in the same precincte of Whitefriars, not fittinge there to be now tolerable"; it had, in fact, very likely been the scene of a terrible accident, for I find in the burial register of St. Dunstan's entries in the year 1607,—"Sept. 29. Gerry, out of the playhouse in the ffryars," his wife, son, and three others within a fortnight, and as the plague was not then raging, but the playhouse particularly mentioned; and that in 1616 it is especially described as "the raine hath made its way in, and if it be not repaired it must soone be plucked downe, or it will fall," I think we have conclusive evidence that at this date (1616) the *first* theatre hereabouts,—the Whitefriars,—had practically ceased to exist.

"Salisbury Court" Theatre was erected just previously to or during the year 1629. It was destroyed by the soldiers in 1649, and not rebuilt till 1660, when it became known as the "Dorset Gardens." The leasing of the property by the Earl of Dorset for a term of sixty-one years, and for 950*l.* paid down as early as 1629, appears to have been a very complicated affair, and the Earl, his successor, when giving evidence before the Great Fire Commissioners of 1667 (as appears by the original documents which I have seen) did not hesitate to call it an illegal transaction. The same property, under the description of "Ye Manor of Dorsett House, with the appurtenances, quitt rents, court leets, and the great barne,"—afterwards the playhouse,—was in the same year (5 Charles I.) sold by Earl Dorset and others to Sir Henry Compton and Sir John Sackville for 4,000*l.* The new theatre (designed by Sir Christopher Wren), built after the Great Fire, and opened November, 1671, was called the "Duke's Theatre," from the Duke of York's company of players performing there. A quarter of a century later the company migrated to Lincoln's-inn-Fields,—the Portugal-street Playhouse, and subsequently the site of the Insolvent Debtors Court. "The Duke's Theatre," Dorset Gardens, was eventually pulled down in 1709, and upon its site since 1814 have existed the City Gas Works.

It may interest your readers to know that in my "Memorials," p. 99, I give a copy of a very interesting and important document relating to "Mr. Ben Jonson, the poet, and the players at the Blackfriars," kindly lent to me by my good friend Mr. Carter, of Fleet-street, for publication.

T. C. Noble.

PROPOSED STREET IMPROVEMENTS AT DURHAM.

At a special meeting of the Durham Town Council, held on Thursday, the 11th ult., at the Town-hall, Mr. Wm. Crozier, C.E., the engineer appointed by the council, read a report laying before them the plans, sections, and books of reference of such improvements as he considered would meet, for many years to come, the requirements for the largely-increased traffic in the city, more especially near the market-place, and the streets leading to it. With regard to borrowing powers, he said,—"Next, as to the financial means at the disposal of your Board for the carrying out of the works. I find the assessable yearly value within your district is 40,410*l.*, and you are allowed to borrow any sum or sums not exceeding in the whole two years' assessable value, or 80,820*l.*, less the present mortgages on the baths and washhouses of 4,454*l.*, which will make the extent of your future borrowing powers, 76,366*l.*; the repayment of the 4,454*l.* can, by the Public Health Act of 1875, be extended to forty years from the present date. Not knowing the exact amount required for the works, I have had a sinking-fund account prepared, showing at per 100*l.* borrowed what will be required for the rates to pay interest, and create a sinking-fund to pay off all in sixty years, and I find, at 4 per cent. per annum, it will take a yearly sum for each 1,000*l.* of 44*l.* 4*s.* 2*d.*, and at 4½ per cent., 48*l.* 9*s.* 2*d.*; to form a sinking-fund and pay interest for forty years on the mortgage of 4,454*l.*, it will require out of the rates yearly, if the interest is 4 per cent., 225*l.* 0*s.* 4*d.*, and if 4½ per cent., 242*l.*"

Mr. Crozier regretted that he had not been able to present an estimate of the cost of the proposed improvements, but it would be forthcoming shortly. The meeting was therefore adjourned to allow of the estimate being presented, and also to give the members time to consider the report and plans.

THE REGISTRATION OF TRADE-MARKS.*

You are all, doubtless, well aware that the Act which establishes a registry of trade-marks does little more than merely decree that establishment. It leaves to the Lord Chancellor, presumably as the principal Commissioner of Patents,—since it is to that body that the direction of the new system has been entrusted, — the duty of preparing the plan on which registration is to be carried on. It is so obviously important that from the outset the system should work smoothly and efficiently, that I feel sure considerable advantages cannot but result, if, before the rules and regulations are finally decided upon, an opportunity is given to those interested in the matter of expressing their views and pointing out what it really is that the mercantile community requires. That even the minuter details of the system are worth thought and attention will hardly, I think, be denied, inasmuch as on these details it must depend whether or no the object of all legislation on the subject be attained, the securing to the possessor the easy and uninterrupted use of his property.

It must seem strange, if we give the matter a moment's thought, that we, the greatest trading nation in the world, have been so far behind our neighbours in protecting our own interests in such an important particular. Not only have America, France, and Austria for some time extended to their manufacturers an advantage we have never provided for our own, but even Spain and Turkey† have, at least in theory, done what we have so long hesitated to do, and, by establishing a registry of trade-marks, shown themselves more awake to the true interests of their commerce than we, with all our experience. Even Germany, who, if reports are true, had but little to gain by authorising the registration of English marks, and thus checking the production of spurious goods with English marks upon them,—has been before us, and has anticipated by a year the process that with us is to begin on the 1st of January next. In the somewhat kindred subject of Patent-law, we took a very decided lead of all other nations, and, with all its undoubted imperfections, we still enjoy the advantages of a system which stands unrivalled by that of any other country. With regard to trade-marks, we have been content to let our neighbours get ahead of us, and thereby reap for themselves an advantage we, as the first commercial nation in the world, ought assuredly to have been the first to secure for our own interests. This being so, it only remains for us to profit by the experience of others, so that by examination and comparison of their systems we may frame for ourselves one including the best points of all.

The connexion between the various monopolies—the word is used in no invidious sense—patent right, copyright, and the right to use a distinctive symbol for purposes of trade, has now been recognised by bringing them—at least those portions of them relating to manufacturing or commercial interests—under one and the same jurisdiction, that of the Commissioners of Patents.‡ The wisdom of this step is obvious. The details of the systems to be applied in treating and recording grants of patents, and registrations of designs and trade marks, are almost identical. The Patent Office has now been at work on its present footing for over twenty years, and there is no question but that on the whole its work has been done well. The Designs Office has only just been transferred from the rule of the Board of Trade, and there is every reason to hope that the practice of that office will

* From a paper by Mr. H. Trueman Wood, B.A., read at the Society of Arts.

† The registration of trade-marks in Turkey seems, at least so far as foreigners are concerned, to be a mere farce. Messrs. Nowill & Sons, of Sheffield, have obligingly furnished us with some information as to their experience in the matter. About three years ago (in 1872 or 1873) they learned from their correspondent in Constantinople that goods were being introduced into the market from Germany, stamped with their name and trade-mark, and enclosed in wrappers with labels almost identical with theirs, the "w" in "Nowill" being reversed and turned into an "m," and "Sheffield" being altered to "Shemfield." Under these circumstances Messrs. Nowill determined to avail themselves of the recent Turkish law, and to register their trade-mark in Turkey. This, however, proved no easy task, and it was not until the beginning of the present year (1875) that they succeeded, after taking considerable trouble, and spending a large sum of money. Having got so far, they proceeded to take action against the infringers, but the result was, that most of the offenders simply took no notice whatever of the summons of the court, and those who did were told to sell out in twenty-one days, and not to do so any more. At this juncture Messrs. Nowill took advantage of the recent German law, and by registering their trade-marks in that country were enabled to get at the original offenders, the makers of the counterfeit wares.

‡ The Lord Chancellor, the Master of the Rolls, and the Attorney and Solicitor General.

be as soon as possible assimilated to that of the department to which it has been annexed. To ensure an efficient administration for the new Trade Marks Registration Office, it will merely be necessary to take the Patent Office system as a model, and adapt it by a few necessary changes to the altered conditions to which it is to be applied. It is therefore certain that the Patent Office, where the requisite machinery for registration is already provided, is the proper place for the registry of trade-marks, and that the framers of the recent Act were in this respect wiser than those who prepared the former Bills dealing with this subject.

It is a remarkable fact, and one therefore which calls for at least a passing notice, that this question of granting to individuals certain privileges or monopolies in return for some contribution made by them to the general stock of knowledge, is now, in various forms, widely attracting public notice, and that it has assumed during the last few years a wider shape than it had before by its extension beyond the bounds of separate nationalities. The question of international copyright every now and then raises up a fresh controversy, which becomes more and more acrimonious, till it exhausts itself for the time. A rather longer and calmer discussion than usual has just resulted in the appointment of a Royal Commission to investigate the subject in all its bearings. Patent-law reform was one of the questions of last session, and only the vigorous and united opposition of all the interests affected prevented the passing of an Act which would certainly have altered, for better or for worse, the existing law. The important Patent Congress at Vienna in 1873; the more recent Conference at the Hague,—these and other events show a very widespread wish for the adoption of some scheme,—what form that scheme should take is yet far from evident,—by which protection should be secured for invention in all countries alike and at once. Less important indeed than these, but second only to them in importance, comes the question of protection for trade-marks.

In this case, as with the other monopolies just mentioned, it is only the consideration of a general advantage that can justify a special privilege. The strongest arguments for the continuance of the few monopolies still existing are based upon the general benefit that results from their use, not on the inherent right—the right is, after all, but a creation of the law—of the individual to retain for his private benefit what he has produced. We believe that the protection of inventions fosters and encourages industry, therefore we grant to the inventor a patent-right in his ideas; we argue that the protection of literary and artistic property aids the development of our literature and our arts, therefore we grant the writer or the artist a copyright in his works; so experience teaches us that by giving the trader every possible assistance in the prosecution of the business he has established, we promote the growth of commerce. Thus the privilege granted to the individual results in the profit of the many, and it is only this beneficial result that justifies the restriction on general liberty.

There is indeed this great difference between the monopoly of a trade-mark and that of patent right or copyright. In the two latter cases the recipient of the privilege gives an actual return for it. He gives to the public an invention before unknown, or he adds something to the literary or artistic possessions of the country. As regards a trade-mark the return is less direct. Still it is none the less real. It is made in two ways. First, it enables the manufacturer to extend and protect his trade; and, secondly, it assists the public in obtaining the precise article they require. This second result is in practice the less important of the two, because there never can be any very wide-spread knowledge among the general public of the various marks used on merchandise. Even in the case of Hall-marks very few people know the meaning of the symbols employed, and so long as there is a mark of some sort on their purchases they are perfectly satisfied. Still there is a certain amount of protection in the use of a trade-mark, if there is sufficient legislative protection to guarantee authenticity. So far is this the case, that it was for long a question in France, before the passing of the latest enactments on the subject, whether the use of a trade-mark should not be compulsory, the manufacturer being obliged to put his mark on all his productions. As it is, under the French law, the power is reserved (and exercised) of ordering such a use in such cases as may seem necessary.

It is not a little curious that this wish to prevent the public from being imposed on by inferior imitations appears, from the preamble of the Act establishing the Cutlers' Company, to have been the principal reason for the passing of the Act, and as Mr. Hindmarch said in his evidence on this point, "the provision as to marks was rather in the nature of a restriction than a right conferred."

PORTSMOUTH IMPROVEMENTS.

THE Town Council of the Borough of Portsmouth have unanimously resolved to apply for power to borrow the sum of 120,000*l.* for the purpose of street and other improvements.

At a meeting recently held a comprehensive report and estimate, prepared by Mr. J. E. Greatorex, the borough engineer, was brought up. In it he estimated that the completion of sewering, road-making, and paving of all the undedicated streets in the borough would cost 92,000*l.*; that 10,000*l.* were required to reimburse the treasurer for moneys already expended in similar works, constructing the new esplanade, &c.; and, that a further sum of 18,000*l.* would be expended in widening streets, making new roads on the site of the old fortifications, now being demolished, and constructing another outfall sewer. And when it is considered that during the last ten years the corporation have expended 160,000*l.* in the construction of sewers, and erection of pumping machinery, it is a pretty fair proof that they are alive to the interests of the community under their charge, and that they are determined to make the borough, including the fashionable district of Southsea, more attractive, and, if possible, more healthy, although it already holds an enviable place in the Returns.

COUNTY COURTS.

A VERY important alteration in the mode of recovering debts not exceeding 50*l.* has been made by the Act of last session (38 & 39 Vic., cap. 50), called "An Act to amend the Act relating to the County Courts." It will result, says the *City Press*, in a large accession of business to these courts, and a great saving of time and trouble to the suitors generally. For the creditor, by proceeding under this Act, is enabled in all cases of debt (and it is not confined to trade-debts only) to issue a summons calling upon the debtor within sixteen days to state whether he intends to dispute the claim or not, and in default of his so doing, the creditor is to be at liberty to go to the county court office and sign an immediate judgment for his debt, without the inconvenience of attending at the court on a crowded court-day, and waiting for his case to be called on and heard. This latter circumstance alone has prevented many tradesmen from using the county court as a vehicle for recovering their unpaid accounts. The order, too, for payment is not to be left to the discretion of the court, but is to be for payment forthwith, or at such times as the creditor shall consent to give. If the debtor sends a notice of defence, then a day is to be fixed for the trial, of which each party is to have six days' notice. The only important formalities to be observed in the adoption of this proceeding are,—first, that the summons must be personally served on the debtor, or be proved to the satisfaction of the registrar to have come to his (the debtor's) knowledge, or that he wilfully evades service; and, secondly, if the debt be under 5*l.*, leave of the registrar is required to issue the summons, unless such debt has been incurred by the debtor in the way of his trade, profession, or calling, in which case no leave is necessary. Hitherto one of the greatest drawbacks to our county court system has been the necessity for the creditor's appearance in court with proof of his debt (often obtained at great inconvenience), when he knows that the debtor has no intention of disputing it; and not unfrequently, in the absence of such proof, the creditor has found himself non-suited, and his money, time, and trouble, thrown away. The Act came into operation on the 2nd of November.

Hayhoe's Patent Solvent.—We have already mentioned this solvent for removing oil paint, oil, varnish, japan, grease, and so on, from wood and stone, without injury to the surface, or to the brushes used. We have since tried its effect on an old door, and found the result to be as promised.

ARE BULGING WALLS TO BE REPAIRED BY TENANT?

PUTLEY *v.* COOPER.

THIS was an action for an illegal breach of covenant to repair. The defendant denied the breach.

The plaintiff was a cooper at Bermondsey, and was the original lessee of certain premises in Seething-lane, City, and the defendant, an eating-house keeper, held the premises from the plaintiff under a repairing lease. It appears, from the *Times* report, that the premises were more than 200 years old, and that a considerable amount of timber had been used in their construction. During the last few years of the defendant's term, in consequence, as it was supposed, of the decay of this timber, one of the brick walls of the building had bulged considerably, and after the expiration of the term the wall had been condemned, and had since been rebuilt by the plaintiff at an expense of 119*l.* He now sought to recover that amount from the defendant, on the ground that under the covenant to repairs in his lease the latter was bound to have made the wall good.

Baron Bramwell, in summing up, asked the jury whether they were satisfied that the defendant had not performed his covenant to maintain the house, walls, &c., in good and tenantable repair and condition. The best direction he could give them in point of law was to refer them to the old adage, "A stitch in time saves nine." The question in this case was whether the stitch required was one that the landlord or the tenant ought to have made. If a slate or a tile came off the roof or perished from decay, it was the tenant's duty to replace it, and any damage that resulted from his neglect to do so he would be bound to make good. But if a coat were sent to a tailor to repair, and it could be repaired by darning up a hole, the tailor was not bound to put in a new sleeve. It was a remarkable circumstance that the defendant had received a notice that he was to take out the bulge and the defective brickwork on each side of the bulge and to rebuild that part of the wall in cement,—that was to say, that he was to make a new piece of wall. Was making a new piece of wall in that way a mere matter of repair, or was it not rather a reconstruction of the building? It had been proved that this bulge had been the work of years, and that it had happened gradually; but that was not decisive against the landlord, because if a stitch in time of an ordinary description could have saved the premises it would be for the tenant to have put in that stitch. The evidence, however, appeared to him to show that the stitch required was not one that the tenant could have been called upon to make, inasmuch as it would have necessitated the practical rebuilding of the structure. The question, however, was one for the jury, who must say whether in this particular case the duty of taking the necessary steps to prevent the bulging of the wall lay upon the tenant or upon the landlord.

The jury returned a verdict for the defendant.

NEW CEMETERIES.

Cowley St. John (*Oxford*).—The foundation-stone of the new cemetery church of Cowley St. John was laid on the 1st ult. The new cemetery will be about three acres in extent. The cemetery church, which will also serve as a chapel of ease to the district, is being erected as a memorial church to the late Archbishop Longley, who was formerly curate of Cowley, and will comprise a chancel, 26 ft. 6 in. long by 20 ft. 3 in. broad, and rising a height of 54 ft. to the top of the cross on the east gable; a nave, 51 ft. long by 25 ft. broad; and a porch, 25 ft. long by 12 ft. broad, running along the west end of the nave, but divided from it by open arches, so as to admit of its being seated when additional sittings are required. The style of architecture adopted is Gothic of the Early Decorated period, Handborough stone being used for the walling, with Box stone dressings. The roofs will be of pine and open, except the chancel, which will be boarded on the underside of the rafters, forming thus a polygonal barrel roof, with moulded ribs at intervals dividing the boarding in panels, the whole being covered in with red tiles and ornamental red ridge cresting. The fittings of the church will be of a somewhat costly nature. The remaining buildings to be erected will comprise a porter's lodge, with Nonconformists' Chapel. The work is being carried out by Mr. Henry Castle, builder, of Cowley-road, under the direction of Mr. A. Mardon Mowbray, architect.

Mold.—For some time past the Burial Board at Mold have been engaged in the selection of plans for two mortuary chapels, lodge, and entrance-gates for the Mold new cemetery, they having advertised for designs to be sent in to them by a specified date; in response to which, designs were submitted by three architects from Mold, Chester, and Denbigh respectively, all of which were anonymously sent. The Board having given them a most cordial consideration, accepted the design of Mr. J. Humphrey Jones, architect, Mold. The two

chapels are combined, having separate entrances, the one for the Church of England, the other for the Nonconformists. Each chapel will contain an area 30 ft. 3 in. by 18 ft. 3 in., and is calculated to seat ninety-three persons, with a vestry accessible to the reading-desk by the sides. A tower 30 ft. high is fixed in the centre of the northern side, in which is placed the bell, surmounted by a spire 24 ft. in height. The style is Gothic, the materials to be used being brick, with stone dressings. The area of the cemetery ground is 3a. 2r. 2p. 17½ yds. The contract has been let to Mr. Hugh Hughes, builder, Maesydu, Mold.

AN ELECTION BY THE BRENTFORD LOCAL BOARD.

Sir,—Knowing your readiness to expose jobbery of any kind, may I call your attention to the fact that the Brentford Local Board, after going through the farce of issuing advertisements inviting applications for the office of their surveyor, receiving about seventy replies, and selecting some six or seven surveyors to attend their Board meeting, have ended by electing one of their own body,—a gentleman who at that time had not even resigned his seat as a member?

As one of the candidates, who was put to the trouble and expenses of printing testimonials, canvassing, &c., believing the election would be an open one, I may perhaps be allowed to express my disgust with the entire proceedings. I send a copy of the *Middlesex County Times*, containing the account of the affair, from which it will be seen that the member of the Board above alluded to was actually elected and attended the Board as the surveyor, and received instructions to proceed with certain works required to be done, before sending in his resignation.

Probably it is hopeless for outsiders to expect much fairness of treatment from Local Boards, composed, as these usually are, of the smaller tradesmen of the district, when the interests of one of their members are in question.

I have no objection to offer to the Brentford Local Board making one of their own members their surveyor, if they see fit to do so. They have the right to elect whom they choose, but I do most strongly object to their wasting the time and money of other people by going through the farce of an "election" when any disinterested person reading the account of the proceedings could come to no other conclusion than that the whole matter from beginning to end was "cut and dried."

The publication of this letter may serve as a warning to intending applicants in the event of a future surveyor being required for Brentford.

One of the Humbugged.

*** We fully agree with our correspondent. Those who wasted their time and money in replying to the advertisement have good reason to consider the affair little else than a swindle.

A FESTIVAL IN THE POTTERIES.

The workpeople employed at the earthenware manufactory of Messrs. Edge, Malkin, & Co., were entertained by their employers on the 16th ult. Mr. Joseph Edge, the senior partner, presided. The company partook together of an excellent knife-and-fork tea, after which a life-sized portrait of himself in oil was presented to Mr. Edge by his workpeople. Mr. W. Steele, principal clerk, introduced this part of the proceeding in a speech in which he spoke very warmly of Mr. Edge's character as an employer and a citizen, and congratulated all present on the excellent feeling existing between the employers and employed at the Newport Works. Mr. Steele was followed by Mr. Whitehall, who read a copy of an address, which had been illuminated by Mr. Ryles, of Congleton, the painter of the portrait. In this address the workpeople assured Mr. Edge that they presented to him his portrait as an expression of their sincere respect and esteem for him as an employer, and in acknowledgment of the kindness and courtesy which he had at all times manifested towards them. The address also referred to Mr. Edge's long life of public usefulness. Mr. Edge said he thanked sincerely and heartily all who had been concerned in this presentation. After an account of the various changes which had taken place in the *personnel* of the firm, Mr. Edge introduced Miss Meteyard, who referred first of all to the honourable position which Mr. Edge occupied in the Staffordshire Potteries. She then spoke of the manner in which purely literary pursuits had gradually led her to take a lively interest in potters and their beautiful art. In continuation Miss Meteyard said:—"During the last twenty years English pottery has in all its branches been so wonderfully improved as to lead to a most successful competition with the production of other nations. We are beating the French in their own fields, and exporting into districts whence, not so long ago, we were glad to derive supplies of a far inferior character. But this success must not make us vainglorious. We have much to do and learn before we reach the perfection of the potters of antiquity. Our bodies are far superior in every sense to theirs, but in the relation to form and in the application of ornament we have much yet to learn and practically adopt. Our comparative backwardness in artistic taste is, speaking nationally, not to be denied, but the deficiency is not, perhaps due to the lack of a real appreciation of its advantages. Taste will increase as the qualities and conditions of instruction approach a higher standard, and our ultimate attainments in art may be none the less distinguished because progress has been slow."

CAMBRIDGE ANTIQUARIAN SOCIETY.

AN ANCIENT TOMB IN ALGERIA.

At the general meeting of the Cambridge Antiquarian Society on the 8th ult., Mr. J. W. Clark presented and described a model of the Medrásen, a circular tomb, 60 ft. in height by 193 ft. in diameter, situated in Algeria, about fifty miles south of Constantine. The base is 18 ft. high, and from it rise sixty engaged columns without bases, and with plain capitals, supporting a massive cornice, which consists of a fillet and cavetto moulding repeated twice, of which the second half projects considerably beyond the first. Above this rises a truncated cone, consisting of twenty-three steps, each 2 ft. high by 3 ft. broad; on the summit is a circular platform, 37 ft. in diameter, having a hole in the centre, the motive for which has given rise to controversy. The latest opinion respecting the name is that it is the plural of Madrès, a mythical ancestor of the tribes of that part of Africa from whom Masinissa claimed descent. If this be so, the legend that the Medrásen is a royal tomb may be true, the plural number indicating that several persons were there interred. The union of the Classic columns and cornice with the barbaric design of the truncated cone appears to indicate an artist familiar with Roman work, so that no very remote date can be assigned to this interesting monument.

At a general meeting held on the 22nd ult., a paper, by Professor Palmer, was read in illustration of the "*hook*" as a symbol of rule in the right hand of the figure of Rameses III., now in the Fitzwilliam Museum. The Professor exhibited and presented a specimen which he described as the *mehján* or camel-stick of the desert Arabs, and variously used as a goad, or a whip, or to hold the halter, or to gather prickly herbs of which the camel is fond, and to hand the beast such provender. Serving as it does so many different purposes connected with the driving, &c., of the camel, it came to be regarded as a fitting emblem of the possession of these animals. But as in the desert all power, wealth, and authority is measured by the number of camels possessed, it is easy to see how this instrument became a symbol of royalty. It is indeed one of the earliest forms of the sceptre, and is sculptured in Assyrian as well as Egyptian monuments. Thus held in the right hand and representing the sovereignty of the *Desert*, it is happily balanced by the three-thonged horse-whip held in the left, and symbolic of wealth and dominion over man and beast in *cities*.

THE GARDENS OF THE INNER TEMPLE.

Sir,—The writer of the letter signed "The Clerk of Works," which was published in the last number of the *Builder*, in reply to one of mine which appeared in the same journal the previous week, stating that the trunk of the old tree in the Inner Temple-gardens spoken of by me has been removed, is entirely mistaken. I visited the Temple-gardens last Saturday to see whether the tree trunk had been removed or not, and found it in its original position, and precisely in the condition I have described it. There is no building going on in its immediate locality. I was fully aware of the existence of another curious tree (the one referred to by "The Clerk of Works") in the Temple-gardens, which he states has been taken down. Had he read my letter carefully, he would at once have seen that the tree I have mentioned is in a different part of the gardens altogether, and of another kind to the one of which he speaks.

Nathaniel Waterall.

STAINED GLASS.

Margate.—A stained glass window has just been placed in the south aisle of the parish church, to the memory of the late Mr. C. T. Hatfeild, of Hartsdown. It is a two-light window,—one light representing the Ascension of Christ, and the other the Old Testament type of it, viz., the Ascension of Elijah. It has been executed by Messrs. Lavers, Barraud, & Westlake.

Fairford.—Messrs. Lavers, Barraud, & Westlake have lately been engaged in restoring several of the ancient stained-glass windows on the south side of this church, under the direction of Lord Dynevor. Great care has been taken in preserving their originality. It is stated that, in the case of a few of the lights especially, if some means are not taken to prevent it, the glass must drop out piecemeal at no very distant date, as the leads are fast becoming completely rotten, and the windows are very far short of being weather-proof.

Nantwich.—Special services were held on the 11th ult. at Nantwich parish church, on the completion of the west window, lately filled with stained glass in memory of the late rector, the Rev. Canon Chater. The window was designed by Sir G. Gilbert Scott, the style being pretty nearly identical with that of the original west window, which dates back to the earlier part of the fourteenth century. The tracery is flowing, the stonework having been carried out by Mr. W. Haswell, of Chester, at a cost of 250*l.*, while the stained glass is being supplied by Messrs. Clayton & Bell, at a cost of 800*l.* The subject, which is treated in accordance with the Middle Pointed period, is that of "Christ Present in His Temple," and the illustrations on either side of the centre light represent (1) The Presentation in the Temple; (2) The Cleansing of the Temple; (3) Christ watching those who brought their Offerings for the Service of the Temple; and (4) Christ receiving the Worship of Children in the Temple.

Tewkesbury.—Two windows by Messrs. Heaton, Butler, & Bayne have just been placed in Trinity Church, Tewkesbury, to the memory of the late Misses Ann and Elizabeth Mines. The one on the south side represents our Redeemer giving the Blind Man his sight, and the one on the north side represents our Saviour standing on the top of a hill with his disciples beneath him.

Whittington.—A stained-glass window to the memory of the late Mr. Hyld Holden has just been completed at Whittington Church, Worcestershire. The window is of lancet form, and the design adopted consists of subjects in medallion upon a groundwork of grisaille, the whole surrounded by a border of richly-coloured glass. The illustrations in this case are—Our Lord blessing little children, and setting a little child before the disciples as an example of humility. The window is by Messrs. Wailes, Son, & Strang, of Newcastle-on-Tyne.

Castlecaulfield.—A stained-glass window, by Ward & Hughes, has just been erected in Castlecaulfield Church, county Tyrone, at the cost of Mr. Robert Evans, of Dungannon, in memory of Eleanor, his wife. The window consists of three lights, on the centre of which is represented the offering up of Isaac. The side-lights represent the parable of the Good Samaritan and the raising of Jairus's daughter.

Hastings.—The east window of Christ Church, Hastings, was unveiled on the 21st ult. The subject is "The Heavenly Court," and the work is by Messrs. Hardman. The cost will be little short of 600*l.* The sacrarium of the church is being decorated by Messrs. Heaton & Butler.

Norwich.—A stained-glass window has recently been placed in the west end of the church of St. Peter per Mountergate, Norwich. The subject is our Saviour blessing little children. The window, executed by Messrs. J. & J. King, contains twenty figures. It is the gift of Alderman John Underwood, in memory of his sister, the late Mrs. Gaze.

BUILDING IN STOKE NEWINGTON.

Sir,—I have observed one or two paragraphs in the *Builder* relative to the houses being erected in Defoe-road, Stoke Newington. In order that you may not think the district surveyor was asleep, I forward you (for your private information) a copy of a letter I addressed to the Metropolitan Board of Works, in reply to one from them asking me for a report. As far as the siftings go, they are used in such a very small quantity in the brick mortar that I think they are infinitesimal compared with the plaster mortar, in which the siftings are used in a much larger proportion.

J. Douglass Mathews.

FEMALE SCHOOL OF ART.

THE students' drawings for the year have been exhibited, as usual, at 43, Queen's-square, and the collection was fairly up to the standard.

Miss Susan Ruth Canton had the National Gold Medal for original design for a spandrel, modelled (the design of which is open to criticism); the first Princess of Wales Scholarship (value 25*l.*); three Third-grade Prizes for a copy from the antique "Juno," modelled; and Vacation Prize for artist's "materials" or sketches.

Miss E. I. Hancock had the Queen's Gold Medal for a group of flowers in oil, from nature (very charmingly painted); National Bronze Medal for a group of flowers in oil, from nature; three Third-grade Prizes for sketches from nature (landscape); and Vacation Prize for sketches from nature.

Miss Alice Hanslip had the Queen's Scholarship (value 30*l.*), for second year; National Bronze Medal for studies of anatomy, and other prizes, including the second prize given by Mr. F. Bennock, for a study from the life in costume.

Miss Gertrude Hamilton, the National Silver Medal.

Miss Emily Austin, the National Bronze Medal.

Miss Jessie Rosina Corcoran, the National Bronze Medal for a set of very good studies from nature.

Miss A. M. Marshall, the National Bronze Medal for some clever modelling.

Miss Florence Reason, the Gilchrist Scholarship (50*l.*), competed for only by students under twenty years of age.

A large number of other pupils also obtained prizes; and Miss Gann feels quite satisfied.

BUILDING ON BONES.

OUR article on "Suburban Buildings" in Hackney District has been extensively quoted and commented upon by the metropolitan and local press circulating in East London. In several instances our statements have been corroborated. We append two or three extracts from the pages of papers published in the district noticed. The *Eastern Post*, under the heading of "The Dead and the Living," says:—

"The *Builder* of last week relates the result of a visit to 'some newly-erected ambitious three-story genteel houses' in the neighbourhood of Victoria-park. After describing the manner in which the ground of the houses was robbed of the natural soil, the writer goes on to say that the most filthy composite matter was shot down into the holes, and amongst it were human remains supposed to have been carted from some of the dug-out yards of condemned City churches. The prominence which other journals have since given to this revelation indicates the prevalence of a belief that such a proceeding is unusual, if not unique. That is by no means the case, for we recently saw large heaps of earth in which were mingled human bones, coffin-handles, and fragments of coffins, which had been shot close to some new buildings in Bromley. The inquiries which we made at the time were answered in such a manner as to give the idea that such matter was regarded rather as an acquisition than otherwise by the builder, and we believe that it was used in the case in question for garden mould. Well might Hamlet say, 'To what base uses may we come,' since the ashes perchance of the noble dead come to be so lightly regarded as to be mingled with dust-hole collections in any heap, where the enterprising builder chalks up, 'Rubbish may be shot here.'"

The *Hackney Express* writes:—

"A very capital article appears in last Saturday's *Builder*, on Suburban Dwellings in the Parish of Hackney. The writer sketches with much force and vigour the characteristics of the open spaces of the district, the prevalence of the 'shoot' system, the nature of public sewers and private house-drains, the death-dealing work of the speculative builder, and finally a few remarks about the parish itself and its rulers. We would gladly reproduce the article in our columns this week did space permit, especially as it is written on the exact lines on which the same subject has been so often discussed in this journal."

The writer of "Our Local Flaneur," in the *Hackney Gazette*, in quoting our article *in extenso* says:—

"I need not apologise to my readers if I, for once in the way, yield place to a larger 'Flaneur' than myself, and give his experience and opinions on the one great absorbing subject to which attention has been so frequently drawn in this column,—a subject that has been the cause of the utmost anxiety amongst my readers, professionally and unprofessionally,—to wit, our horrid Fever Haunts. It will be seen that my friend of the *Builder* has done his spiriting well and forcibly, and it is to be hoped will be a little more efficacious than our own in awakening the slumbering authorities to a sense of their responsibilities."

We hope our article may have the effect intended, and if the local press continue to do its duty, we have little doubt a reform will soon be visible.

The *Sanitary Record* says,—"Fresh complaints have just been made in our contemporaries of the digging gravel and sand from the sites of intended houses, and filling up the holes with refuse of the most abominable kind. One of the latest has just appeared in the *Builder*, and is stated to have occurred on the borders of Victoria Park, or rather in a space of ground which is situated between two divisions of the park. The ground was dug out, and the gravel and sand removed to a depth of from 6 ft. to 8 ft. where the houses were to be built, and to a much greater depth for the roadways, and the holes then filled up with filthy refuse, including human bones. The writer suggested that these came from some condemned City churchyard, but we are unable to affirm or object to his supposition, in consequence of the houses having been built some short time since. We have repeatedly called attention to this shameful state of things, and shall continue to do so till these deposits are discontinued. The matter is aggravated in this particular case by the unusual depth and extent of the excavations and subsequent deposits, as well as by the houses having a 'most respectable and genteel' appearance, and being known to be situated on a gravelly soil, so that occupiers and intending purchasers would scarcely think of making inquiry into the character of the subsoil."

AN INDECOROUS CIRCULAR.

MR. HENRY BAKER, with his compliments, encloses a circular which has been forwarded to him as a subscriber to the fund in aid of the widow and children of the late W. H. Knight, and which he thinks is deserving of severe censure, looking to the scandalous facetiousness of the mention of "the other officer," and the name last on the list, quite unintelligible to those not in the distinguished company of officers of the Metropolitan Board of Works.

The circular commences thus:—

Sir James Macnaghten, Hogg, K.C.B., M.P., Chairman of the Board	£5	5	0
The Officers of the Metropolitan Board of Works	39	9	0
The other officer	0	0	0

The last two names in the list stand thus,—

W. Williams	£0	10	0
T. E. Knightley	0	0	0

We entirely agree with Mr. Henry Baker in the opinion he has expressed. We know nothing of the circumstances attending the subscription in question, but the grave impropriety of the proceeding under any circumstances is obvious, and if allowed to pass unquestioned might form a precedent with very evil consequences.

The letter with which the list is forwarded is dated from the "Metropolitan Board of Works," and signed "F. W. Goddard."

SCHOOL BOARD SCHOOLS.

Arbirlot.—At a meeting of the Arbirlot School Board, on the 20th ult., alternative plans of a schoolhouse were submitted by Messrs. Aikenhead and Mason, architects. The first was a plain unpretending structure of one story, having four rooms on the ground flat, with two small bedrooms under the slates. The second was more elevated, having kitchen, parlour, and dining-room on the ground floor, and three bedrooms on the upper. The second design was adopted.

Shelf.—At a special meeting of the Shelf School Board, on the 18th ult., a committee was appointed to negotiate the purchase of a plot of land in Shelf Hall-lane, near Longrow, which had been favourably reported on by the architects, Messrs. Jackson & Fox, of Halifax, as an eligible site for a new infants' school.

Tadley.—At a meeting of the Wootton and Tadley United School District Board, on the 17th ult., it was agreed to appoint a committee to consult with Mr. Moore, of Basingstoke, as to the erection of the Tadley School, subject to some modifications of his designs.

Great Sampford.—New Board schools are about to be erected at Great Sampford, from plans by Mr. Pertwee, architect, Chelmsford. Provision is to be made for 120 children. Mr. Geo. Wiffin, of Saffron Walden, is the builder, the contract price being 630*l.*

Heage.—At a meeting of the Heage School Board, on the 17th ult., Messrs. Wilson & Masters, of Sheffield, were appointed architects to the Board. It is proposed to erect two schools.

Auchterarder.—On the 16th ult. new Board schools at Auchterarder were formally opened. The building, which is in the Elizabethan style, consists of two large and one small class-room, together capable of holding 250 pupils,—the boys and girls having separate departments. The architect was Mr. Simpson, of Stirling. The cost was about 2,000*l.*

Great Totham.—The Great Totham School Board have entered into a contract with Mr. John King, builder, of Halstead, in the sum of 985*l.*, for the erection of their school buildings in accordance with plans by Mr. Charles Pertwee, of Chelmsford. Accommodation is to be provided for 150 children, with teacher's residence, and offices.

VACANT DISTRICT SURVEYORSHIPS.

AT the meeting of the Metropolitan Board of Works on Friday, the 26th ult., the following recommendation came up from the Building Act Committee, viz.:—

"That the District of St. Matthew, Bethnal-green, vacant by the decease of Mr. J. H. Stevens, be divided into two districts, to be designated Bethnal-green East and Bethnal-green West, and that Cambridge-road do form the line of boundary between such districts."

This recommendation gave rise to a long discussion, in the course of which it was contended that the proposed two districts were unequally divided in regard to the income likely to be derived from each, the western division being estimated as worth 350*l.* per annum, and the eastern division at 250*l.* It was suggested that the districts should be so apportioned as to allow 400*l.* to each surveyor, and an amendment to refer the whole matter back to the Committee for consideration and report was proposed. It was urged by those who supported the amendment that the Board should make the surveyorships, as far as possible, equal in value, and fairly lucrative, so that professional men of ability and integrity would be induced to compete for the appointments. A district surveyor was expected to discharge the duties of his office in person, but it was necessary for him to have a local office, the expense of which was about 100*l.* per annum, so that if the gross income of a district was only 250*l.*, no man of professional standing and repute would seek for the appointment. On the other hand, it was contended that the figures quoted were not reliable, and that the income of the eastern division would be much larger than stated, especially in a year or two to come. Incidentally it was remarked that there need be no fear of not getting men of professional standing to fill the appointments; architects were only too eager to obtain surveyorships under the Board, as evidenced by the large number of candidates presenting themselves whenever a vacancy occurred. It was further remarked by Mr. Selway (chairman of the Building Act Committee) and Mr. F. H. Fowler, that it would be the best plan not to split up the larger and more valuable districts as the surveyorships became vacant, but to retain them as they are, and promote to them the most deserving of the surveyors who had served perhaps for many years in smaller and less lucrative districts. The amendment to refer back was negatived by 23 to 14, and the committee's recommendation was adopted. It was then resolved that the usual course be taken for filling up the vacancies in the offices of District Surveyor for the above-mentioned two districts, and that the Board do proceed to the elections on Friday next, the 10th inst.

TIMBER.

SIR,—Perhaps some of your readers will kindly give me the name and address of the gentleman who patented, some few years ago, a process for preventing timber from shrinking after drying, by steeping it in a solution of borax. It was, I believe, an American invention, but patented in England. OAK.

THE POWERS OF LOCAL BOARDS.

IN the High Court of Justice, Queen's Bench Division, on the 15th ult. (before the Lord Chief Justice and Justices Mellor and Quain), the case *ex parte* Dalton-in-Furness District Local Board *v.* The Justices of the Petty Sessional Division of Lonsdale North of the Sands was heard. Mr. Poland, Q.C., moved on behalf of the Dalton-in-Furness Local Board for a rule calling upon the Justices of the petty sessional division of Lonsdale North of the Sands to show cause why they should not be required to state a case for the opinion of the High Court upon questions of law raised before them in an information against James Cox for an offence against the 32nd bye-law of the Local Board. The justices dismissed the information. Cox was charged with intending to build certain new houses in Dalton-in-Furness without giving notice to the surveyor of the Local Board and delivering plans and sections, under their 32nd bye-law. A penalty attached of 5*l.*, and a further penalty of 40*s.* per day for the continued offence. The point raised was whether the Local Board had power under another bye-law to pull down the houses without giving notice to the defendant. The Court granted a *rule nisi*.

Dwellings for the Poor at Stratford-on-Avon.—The Mayor of Stratford-on-Avon has intimated that the favourable replies he has received in answer to the circular recently issued by him drawing attention to the great need of improved dwellings for the poor in Stratford-on-Avon justifies him in calling a public meeting, to be held at the Town-hall, on December 8. The business of the meeting will be to state the necessity that exists for immediate action in the matter, and to consider the best form for that action.

CHURCH BUILDING NEWS.

Lincoln.—The foundation-stone of the new Church of St. Andrew, for the parish of St. Peter-at-Gowts, Lincoln, was laid by the Bishop of the diocese on Tuesday last, the 30th ult. The architect for the new church is Mr. James Fowler, of Louth, and the builders are Messrs. Huddleston & Son, Lincoln.

Netteswell.—Netteswell Church, near Harlow, which has fallen into a very dilapidated condition, has been substantially restored, and a new vestry added. The old stonework to the windows and doorways is carefully preserved, and only restored where absolutely necessary. The roofs have been all stripped and repaired, and that part over the chancel is entirely new. The porch has been rebuilt on the south side after the design of the old one, in which some of the old timbers are replaced in their original positions. A new floor is laid in the chancel with Godwin's encaustic tiles; and Peake's Staffordshire quarries are used for the pavements in the nave, vestry, and porch. Porritt's air-warming stove is adopted for heating. The architect was Mr. F. Chancellor; and the works have been carried out by Mr. Gibbons, of Buntingford, at a cost of about 900*l.*

Brabourne.—The ancient parish church of Brabourne, which has been for some time in course of restoration, has been re-opened. The old oak roofs of the nave and chancel, which were greatly decayed, have been thoroughly restored; and the curious oak ceiling above the altar has been replaced. The massive Norman arch between the nave and chancel, which was crushed out of all form, has been taken down and re-built stone by stone. The Scott chapel, on the south side of the chancel, filled with the monuments of the Scott family, has been thoroughly restored. The curious clearstory windows, the stonework of which was sadly perished, have been almost entirely renewed. The masonry of the tower has been repaired and strengthened; the ugly brick partition which shut the tower off from the nave has been cleared away, and the western window, which had been torn down from its place, and the place filled with brick, restored. The restoration of the chancel has been undertaken by the Ecclesiastical Commissioners, under the superintendence of Mr. Ewan Christian, their architect, that of the Scott chapel by the representatives of the Scott family, and the nave and tower by the parishioners, Sir G. G. Scott, R.A., and Mr. A. A. G. Colpoys, being the architects. The contract for the entire work was taken by Mr. H. B. Wilson, of Canterbury.

Ford.—The parish church of Ford was re-opened on the 17th ult., after restoration and enlargement. Nave and chancel aisles, as well as a vestry, have been built out on the north side. The nave arcade is of three bays; the chancel aisle, which is provided for the school children, opens by arches into the chancel and nave aisle. A three-light east window takes the place of the modern square-headed one, and new traceried windows have been substituted for those of the last century "churchwarden" type throughout the church; they are glazed with thick cathedral-tinted glass, in quarries and patterns, by Mr. W. Done. New floors are provided. The chancel is paved with Maw's tiles. The nave and north aisle are fitted with open seats of pitch pine, and the chancel with stalls of the same material; the rest of the fittings, viz., pulpit, altar-table, altar-rail, and credence are of oak. The old oak screen between nave and chancel has been restored, and the interesting carved oak reredos. The roofs are covered with Mr. Parson Smith's tiles. Mr. W. Dodwell supplied the warming apparatus. The accommodation is for 185 persons, being an increase on the ground floor to the extent of eighty sittings. The cost has been about 1,500*l.* The work has been carried out by Messrs. Bowdler & Darlington, from the designs and under the direction of the Salop-in-Lichfield diocesan architect, Mr. Haycock.

Kirbymoorside.—On the 23rd ult. the Archbishop of York preached at a thanksgiving service in celebration of the restoration of Kirby-moorside Church. In the recent restoration, Sir Gilbert Scott, R.A., was employed. The work of restoration has occupied nearly two years. A new chancel has been added; the old high-backed pews have been removed and replaced by stained pine stalls. The unsightly gallery has been taken away, and the church is now light and open in appearance. A new organ, by Messrs. Forster & Andrews, of Hull, has also been erected. The sole contractors for the work were Messrs. Weatherley & Rymer, of York, builders. The cost has been between 3,000*l.* and 4,000*l.*

Chesilborne.—On the 11th ult. the parish church of Chesilborne, Dorset, was re-opened, after restoration, at a cost of 900*l.* There are many points of interest in the church, which possesses very good features of both the Decorated and Perpendicular periods, one singularity being in the arcading, that between the nave and south aisle having a large and smaller early arch and columns; a small arch was afterwards added in the tower during the Perpendicular period. The north aisle appears afterwards to have been added with irregular-sized openings, but differing from the south side in the largest opening being at the west end, and a small opening at the east end. In the restoration care has been taken to preserve the ancient work. New roofs have been put to the nave and south aisle. The whole of the work has been carried out by Mr. John Wellspring, builder, of Dorchester, under the superintendence of Mr. G. R. Crickmay, architect, Weymouth.

Miscellanea.

The Warrington Arbitration Cases.—Mr. Leofric Temple, Q.C., the arbitrator in the four cases of Pierpoint *v.* Artingstall, Artingstall *v.* Pierpoint, Collin *v.* Artingstall, and Artingstall *v.* Collin (to which we referred some ten weeks ago, p. 825, *ante*), has just been given. Mr. Temple awards and finds that in the action of Collin *v.* Artingstall, the plaintiff has no cause of action, and he awards and orders that a verdict for the defendant be entered on all the issues therein. In the action of Artingstall *v.* Collin he finds that the plaintiff has good causes of action against the defendant on the issues joined on the money counts, and he awards and orders a verdict to be entered on the said issue for the plaintiff for the sum of 150*l.*, and on the other and remaining issues in the said action, he awards and orders a verdict to be entered for the defendant. And as to the action of Pierpoint and Others *v.* Artingstall, he awards and orders a verdict to be entered for the defendant on all the issues joined therein. And as to the action of Artingstall *v.* Pierpoint and Others he awards and orders a verdict to be entered on all the issues for the plaintiff, with damages 40*s.* And in each and every of the said four actions he grants all certificates necessary to enable the successful party to recover his costs. And he awards and orders that John Pierpoint shall give security to the said George Artingstall for the sum the said George Artingstall is entitled to recover in the action of Artingstall *v.* Collin. And he awards and orders that in the said causes the costs do follow the event; and that John Pierpoint and Robert Wood Collin do each of them pay a moiety of this award and of the arbitration.

Oxford Architectural and Historical Society.—The first of the series of walks for this term took place on the 13th ult., when a party of about fifty ladies and gentlemen assembled at St. Mary's Church, where they were received in the chancel by the vicar, the Rev. J. W. Burgon. In pointing out some of the many objects of interest in the church, the vicar said that behind the woodwork, by the altar, was a curious old piscina. Proceeding through the vestry and a small yard, the party entered the Old Convocation House, and from thence a visit was paid to the lecture-room upstairs. On leaving this, the party entered the chapel at the north-west corner of the building, which, the vicar said, was of considerable interest. It was built in the fourteenth century by Oriel College, and in it was the tomb of the founder, Adam de Brome. He trusted that the chapel would be thrown into the body of the church. It was now used as a robing-room by the heads of houses. On the south wall of the church seven angels were carved, one of which was unlike the rest, that over the pulpit being a work of great artistic merit. In reply to a question, Mr. Burgon said that in the alterations which it was proposed to carry out, it was intended to remove the screen and gallery on the north side, throw the chapel he had mentioned into the church, put stained glass in the whole of the windows, re-seat the church, and fill with mosaics the space over the porch door.

Registration of Trade Marks.—It is contemplated forthwith to constitute a Trade Marks Committee to consider the subject in detail, to bring the views of the commercial community before the Lord Chancellor, and, if necessary, to apply for the reception by his lordship of a deputation.

Worcester Guildhall.—Mr. Waterhouse has reported to the Worcester Town Council on a reference to him by that body to consider whether it would be possible to reconstruct the present Guildhall, so as to provide the public offices, halls, and courts, necessary for the proper transaction of the business of the city of Worcester, or whether, in order to provide such accommodation adequately, it would be needful or advisable to pull down the existing structure altogether, as well as the other Corporation buildings in the rear, or any of them, and to erect in their place an entirely new building. He recommends the retention of the present front, in order to form the centre of the *façade* of a more imposing block of buildings. The north and south wings, with the adjacent buildings, he proposes to clear away, with the view of obtaining a sufficiently ample site for a building containing the required accommodation. The present front he proposes to support on either side by a projecting wing, 24 ft. wide, so that the present front will be thrown into a recess. Mr. Waterhouse estimates the cost at from 30,000*l.* to 35,000*l.*

Annual Art Exhibition at the Royal Institution, Manchester.—The prizes offered in connexion with the 55th annual exhibition of modern works of art held at the Royal Institution in Manchester have been awarded as follow:—A prize of 50 guineas to the artist of the best figure subject, painted in oils, awarded to Edward F. Brewtnall, for his picture of "Crabbed Age and Youth"; a prize of 50 guineas to the artist of the best landscape or marine subject, painted in oils, to J. C. Hook, R.A., for his picture of "Wise Saws"; a prize of 50 guineas to the artist of the best water-colour drawing to Francis Powell, for his drawing of "Loch Corruish, Isle of Skye"; a prize of 50 guineas, given by Mr. G. F. Watts, R.A., to the artist of the picture "of the most poetic design—the best picture regarded from the highest point of view," to C. J. Gregory, for his drawing of "Sir Galahad"; and the Heywood gold medal, or 25*l.* in money, to the artist of the most meritorious work of art, to W. W. Ouless, for his portrait of "H. D. Pochin, Esq."

Lectures on Work and Wages.—On this Saturday, the 4th inst., the first of a course of four lectures on this subject will be delivered by Professor Leone Levi at King's College, free of charge, to members of workmen's clubs and institutes affiliated to the Club and Institute Union. The titles of the lectures are as follows: "The Work and the Workers," "The Reward of Labour," "Trade Unions," "Strikes and Lock-out, Conciliation and Co-operation." The lectures will be delivered on Saturday afternoons at four o'clock, and some well-known public man will preside on each occasion. Mr. Samuel Morley, M.P., has consented to be present at the first lecture. A special feature in the arrangements is that after each lecture an hour will be devoted to the discussion of the subject, when the Professor will be glad to answer any questions put. At the conclusion of the course an examination will take place for such members of the clubs as may desire to attend; and the Cobden Club has offered 10*l.* worth of prizes to successful candidates.

Brickmaking Machines.—On the 23rd ult. a meeting of the master builders of Liverpool was held at the Clarendon-rooms, South John-street, for the purpose of considering the advisability of forming a company, consisting of builders only, with the object of obtaining one or more of Batley's Patent Plastic Brick-making machines, together with a suitable clay mine. The chair was occupied by Mr. William Evans, who, in opening the proceedings, said he thought it was high time that something in the shape of machinery should be introduced in Liverpool into the brickmaking trade. Mr. Baker expressed the opinion that the object of the meeting would have the sympathy of the building trade of Liverpool if it would render them a little more independent of the people who made bricks by hand. Mr. Batley having explained the principles of his machine, a committee was appointed to examine one of the machines in actual operation, and report thereon to an adjourned meeting.

The Exeter Reredos.—The additions to this erection in Exeter Cathedral are now nearly complete. Sir Gilbert Scott has himself, to a great extent, personally superintended the alterations. The additional height now obtained has been recognised as requisite from the first.

Architectural Association of Edinburgh. The opening meeting of the session of the Edinburgh Architectural Association was held in their Rooms, 37, George-street, on Friday evening, the 26th ult. The meeting took the form of a fine art and literary *conversazione*. On the walls were hung a number of architectural drawings, and on the table were likewise laid an interesting series of water-colours of "Old Edinburgh," along with a selection of photographs of fine specimens of Continental architecture. Mr. Robert Anderson, president of the Association, delivered an address, commenting on the prosperity of the Association and the decided step they had taken in starting a printed sketch-book of the architectural remains of Scotland. A cordial vote of thanks to Mr. Anderson brought the meeting to a close.

An Englishman's House his Castle.—At the meeting of the Runcorn Sanitary Authority, on the 24th ult., Mr. Edwards asked the clerk whether a sanitary officer had power, without a magistrate's warrant, to enter any habitation, without the permission of the tenant, to make an inspection of the premises. The clerk quoted the 102nd section of the Public Health Act, the effect of which was that if the occupier refused to give his permission for his premises to be inspected, the sanitary officer could not enter without having obtained a warrant from a magistrate to do so, notice having been given to the occupier of his application. Mr. Edwards expressed himself satisfied, and said that an Englishman's house was still his castle.

New Masonic Hall at Stockton.—The foundation-stone of a new Freemasons' Hall was laid at Stockton on the 18th ult. The site of the new building is in Wellington-street. The existing Masonic hall was erected in 1869, at a cost of about 5,000*l.*, but Masonry has prospered so much in Stockton of late as to render the existing hall totally inadequate for the lodges in the town. The adoption of the Free Libraries Act in the borough presented an opportunity of disposing of the present hall to the Corporation, and plans for a new building, estimated, with site, to cost about 6,000*l.*, were prepared by Messrs. Weatherill & Moses. The builders are Messrs Craggs & Benson, of Stockton.

The Zetland Working Men's Club, Richmond, Yorkshire. — The new Zetland Club, presented by the Earl of Zetland for the benefit of the working classes of Richmond, was formally opened by his lordship on the 25th ult. The site selected is in Newbiggin, and faces the Freemasons' Hall. The building, which was completed in the spring of the present year at a cost of nearly 2,000*l.*, was erected by Messrs. Thwaites & Son, of Richmond, and is well finished. The other contractors were Mr. Wm. Naylor, joiner; Mr. R. Barker, plumber; and Mr. Baines, slater, of Ripon. The dimensions of the hall are 52 ft. long by 24 ft. wide, and about 30 ft. high.

Liverpool Plumbers' Society.—On the 22nd ult. the annual *soirée* and ball of this Society took place at St. George's Hall. Upwards of 800 persons sat down to tea. At half-past nine o'clock the chair was taken by Mr. Councillor Lewis. Mr. Dobbs, the secretary of the Society, read the balance-sheet for the year 1874, which showed that the income from the ball last year amounted to 77*l.* 16*s.* 6*d.* The expenditure during the year was 89*l.* 14*s.*, and there was a deficiency of 11*l.* 17*s.* 5*d.* The chairman, in the course of a short address, impressed upon the members the necessity of providing for the widows and orphans of those belonging to their trade.

Sanitary Science in Rural Districts.—Mr. James Howard, Mr. J. Bailey Denton, and Dr. Abbotts Smith have adjudicated upon the essays "On the application of Sanitary Science to Rural Districts, with a view to ensure the Highest Condition of Health, and the Prevention of Disease," in competition for the prize of 25 guineas offered by Dr. Lory Marsh. The *Chamber of Agriculture Journal* learns that nineteen essays were sent in, and that the gentlemen above-named have awarded the prize to Mr. C. F. Gardener, of Ashbourne, Derbyshire, who was the successful writer of the essay on local taxation for the prize offered by our Local Taxation Committee.

"The Cattle Show." — The Smithfield Club's Show of Fat Cattle, Sheep, Pigs, and Implements, will open on Monday, the 6th of December, and remain open until the 10th, inclusive, at the Agricultural Hall, Islington.

Kilmarnock New Academy.—The memorial stone of the new Academy, Kilmarnock, was laid with Masonic honours on the 20th ult. by R. W. Cochran Patrick of Woodside, Depute P.G.M. of Ayrshire. The new school, which is intended to supply the place of the old Academy of Kilmarnock (erected about seventy years ago, and now about to be closed), is situated in North Hamilton-street, and consists of a centre building of two stories, with wings of one story occupying a frontage of 150 ft. The style is Elizabethan, and the architect was Mr. Wm. Railton. Accommodation is being provided for about 600 pupils, and the cost will be about 5,000*l.*

The Middlesbrough Surveyorship.—At a meeting of the Middlesbrough Rural Sanitary Authority, on the 25th ult., it was stated that for the office of sanitary inspector and surveyor, at a salary of 150*l.*, there were thirty-four applications. The following names were selected from the list:—Mr. J. W. Aird, Huddersfield, surveyor and inspector; Mr. John Cook, Sunderland, surveyor and inspector; Mr. R. C. Foster, Gateshead, assistant surveyor; Mr. George Harrison, Glaisdale, surveyor; and Mr. Joseph Nelson, Middlesbrough, builder. The meeting was adjourned for a fortnight, when the appointment will be made.

The Royal Archæological Institute.—In view of the intended visit of the Archæological Institute to Colchester in July next, a meeting of the Council of the Essex Archæological Society was held on the 17th ult., when a sub-committee was appointed, to act conjointly with the Museum Committee of the Corporation, and to communicate with the Archæological Institute in making the necessary arrangements for the proposed visit. At this meeting there were thirteen new members of the Essex Archæological Society elected.

State of Lincoln Cathedral. — Canon Blakesley, in a letter explaining why they called in a civil engineer as well as their architect, says:—"The importance of the matter may be imagined when I say that although to the eye of the common observer the appearance of the structure will not be altered if the attempt to be made is successful, yet the danger now apprehended is no less than that of the fall of a large portion of the western front and one of the towers."

Death of Mr. A. B. Houghton.—Mr. A. B. Houghton, one of the most able draughtsmen on wood connected with the illustrated press, died on the 23rd ult. at the age of thirty-nine. He was a member of the Old Water Colour Society, and contributed to the Royal Academy and other exhibitions. He was buried at Willesden Cemetery on the 27th ult.

"The Art of Garnishing Churches."—Those of our readers who wish information as to the decoration of churches, will find it in the 4th edition of Mr. Edward Young Cox's book, thus entitled. The work has been revised and improved, and contains all that is necessary, and more.

The City Poultry Market.—This building was opened on Tuesday last (November 30th), members of the Corporation eating a good dinner together on the occasion. A view and particulars of the market will be found at pp. 821, 823, *ante*.

Architectural Association of Ireland.—The opening meeting was held on the 25th ult. We have before us the address delivered on the occasion by the President, Mr. Thomas Drew, and will print some portions of it in our next issue.

Health Lectures for the People.—The Manchester and Salford Sanitary Association, with the view of extending the usefulness of the lectures prepared and delivered by their members, have decided to issue them under the title of "Health Lectures for the People."

The Macclesfield Carpenters.—The carpenters of Macclesfield have given notice that they require an advance equivalent to 6*s.* per week, and a reduction of time from 54½ to 54 hours.

Sculpture.—Mr. Wm. Day Keyworth, jun., has completed a statue of the late Mr. James Clay, M.P., to be placed in the Hull Town-hall, erected by public subscription.

The Royal Academy. — Professor John Marshall, F.R.S., commenced his annual course of lectures on Anatomy at Burlington House, on Monday last, the 29th ult.

Another Opera House for Paris.—It has been determined to erect a vast opera-house in front of the Château d'Eau, intended to seat about 9,000 persons.

The Over Darwen Stonemasons.—The stonemasons of Over Darwen struck work on the 22nd ult., to resist a reduction of 1*s.* per week.

TENDERS

For building a cottage and laundry at Westcott. Mr. Dibble, architect:—

Lynn & Dudley	£680 0 0
Heselgrave	501 0 0
Hamblin Brothers (accepted)	485 0 0

For boiler-house, loose box, &c., Mill Lodge, Barnes, for Mr. S. W. Keene. Mr. E. Leuchars, architect:—

Sale (accepted)	£122 0 0

For additions at No. 20, Barnsbury Park, for Mr. C. Cox. Mr. G. W. Warr, architect:—

Pemberton	£408 7 6
Whiting	309 0 0
Brown	300 0 0
London Artisans' Building Company	245 0 0

For roofing over part of the premises of Messrs. Frost Brothers, Shadwell. Messrs. Wilson, Son, & Aldwinckle, architects. Quantities supplied:—

Wood	£839 0 0
Ashby & Horner	744 0 0
J. & F. Coleman	650 0 0
J. K. Coleman	617 0 0
Mackay	600 0 0

The tender of Messrs. Guynan & Son for blinds to the Manchester new Town Hall (Mr. Alfred Waterhouse, architect) has been accepted.

For alterations to warehouse, fitting up offices, &c., at No. 11, Curtain-road, for Messrs. L. Rose & Co. Mr. J. Groom, architect. Quantities not supplied:—

Smith	£570 0 0
Staines & Son	487 0 0
Woodward	446 0 0

For repairs, alterations, painting, &c., for Messrs. Grout, at No. 102, Bishopsgate-street Within. Mr. B. Tabberer, architect. Quantities not supplied:—

Larke	£570 0 0
Monk	474 0 0
Downs	473 0 0
Cohen	472 0 0
Staines & Son (accepted)	443 0 0

For alterations, office fittings, &c., at Gresham Buildings, for Messrs. Sanderson & Murray. Mr. C. M. Beazley, architect:—

Staines & Son (accepted)	£183 0 0

For new schools, Canning Town, for the West Ham School Board. Mr. J. T. Newman, architect. Quantities supplied by Messrs. R. L. Curtis & Sons:—

Ennor	£5,887 0 0
Bangs & Co.	5,878 0 0
Norton & Son	5,833 0 0
Knight & Dastow	5,815 0 0
W. J. Rivett	5,783 0 0
Niblett & Son	5,760 0 0
Hosking Brothers	5,657 0 0
Morter	5,473 0 0
Atherton & Latta (accepted)	5,300 0 0

For sewers, sewage tanks, &c., for Evesham Drainage. Messrs. Gotto & Beesley, engineers:—

Meredith	£5,443 0 0
Jones & Fitzmaurice	5,431 0 0
Everall	5,379 13 6
Botterill & Co.	4,600 0 0
Meats	4,452 18 6
Walker	4,435 0 0
Dixon	4,293 0 0
Bugbird	4,200 0 0
Coker	4,173 2 8
Goodair	4,038 0 0
Cowdery & Sons	4,022 19 0
Webb	3,959 0 0
Kelly	3,430 0 0
Barnes & Co. (accepted)	3,328 0 0

For various works about to be commenced for the North-Eastern Railway Company:—

South Shields Branch.

Forster	£36,286 0 0
Tone	35,696 0 0
Gibb	35,000 0 0
Elliot	33,983 0 0
Waddell	33,960 0 0
Nelson	33,908 0 0
Scott (accepted)	29,640 0 0
Adamson	27,589 0 0

Alterations near Monkwearmouth Station.

Hurst & Sons	£16,065 0 0
Scott (accepted)	16,015 0 0

Railways near Durham.

Waddell	£26,096 0 0
Gibb	26,000 0 0
Nelson	24,432 0 0
Scott (accepted)	22,355 0 0
Adamson	20,392 0 0

Alterations at Shot Factory-lane, Newcastle.

Gibb	£9,656 0 0
Waddell	9,092 0 0
N. & R. Reed	8,900 0 0
Jackson	8,290 0 0
Broomhead	7,773 0 0
Scott	7,766 0 0
Elliot	7,510 0 0
Lee (accepted)	7,050 0 0

For erection of school and offices, Peter-street, Farringdon-road. Mr. E. R. Robson, architect. Quantities by Mr. W. H. Barber:—

Gammon & Son	£8,171 0 0
Hook & Oldrey	8,024 0 0
Boyce	7,988 0 0
Oliver	7,972 0 0
Newman & Mann	7,882 0 0
Coleman	7,780 0 0
Nightingale	7,743 0 0
Eanor	7,648 0 0
Williams & Son	7,600 0 0
Grover	7,347 0 0
Wall Brothers	7,333 0 0
Hobson	7,196 0 0

For new schools, Laugdon-road, Holloway, for the London School Board. Mr. E. R. Robson, architect. Quantities by Messrs. Northcroft, Son, & Neighbour:—

Boyce	£10,822 10 0
Downes	10,779 0 0
Lawrence	10,677 0 0
Roberts	10,584 0 0
Williams & Son	10,520 0 0
Nightingale	10,371 0 0
Pritchard	10,327 0 0
Hook & Oldrey	10,320 0 0
Wall Brothers	10,210 0 0
Grover	10,191 0 0
Hobson	10,075 0 0

For new school and offices at Horseferry-road, Westminster, for the London School Board. Mr. E. R. Robson, architect. Quantities by Mr. John Nicholls:—

Wall Brothers	£8,136 0 0
Carter & Son	8,095 0 0
Hobson	7,931 0 0
Eanor	7,860 0 0
Scrivener & White	7,790 0 0
Downes & Co.	7,678 0 0
Hook & Oldrey	7,586 0 0
Jerrard	7,483 0 0

For decorations at the mansion, Twyford Abbey, near Ealing. Mr. Walter Graves, architect:—

Haynes	£850 0 0
Scott Brothers	557 0 0
Hook & Oldrey (accepted)	549 0 0

For the erection of a school for 550 children, on the site in Fairfield-road, Bow, for the School Board for London. Mr. E. R. Robson, architect:—

L. H. & R. Roberts	£7,282 0 0
Kirk & Randall	7,275 0 0
Boyce	7,114 0 0
Williams & Son	7,102 0 0
Newman & Mann	7,086 0 0
Smith	7,076 0 0
J. & F. Coleman	7,042 0 0
Sheffield	6,974 0 0
Hobson	6,937 0 0
Eanor	6,888 0 0
Wall Brothers	6,878 0 0
Downs & Co.	6,870 0 0
Grover	6,664 0 0
Lawrance	6,570 0 0
Timewell	6'514 0 0
Hook & Oldrey*	6,399 0 0

* Recommended by the Works Committee for acceptance.

For certain alterations and additions to the St. John's, Halley-street, Limehouse, School, and for enlarging the school by 276 places, for the School Board for London. Mr. E. R. Robson, architect:—

Atherton & Latta	£4,490 0 0
F. & F. J. Wood	4,360 0 0
Sheffield	4,275 0 0
Kirk & Randall*	4,230 0 0

* Recommended by the Works Committee for acceptance.

For alterations and additions at the Prince of Wales, Hackney, for Mr. More. Mr. Edward Brown, architect:—

High (accepted)	£1,600 0 0

For rebuilding six houses and shops at the corner of Chancery-lane and High-Holborn. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. L. C. Riddett:—

Elkington	£22,612 0 0
Chappell	22,223 0 0
Browne & Robinson	21,768 0 0
Patman & Fotheringham	21,486 0 0
Foster	21,479 0 0
Macey	20,892 0 0
Killby	20,767 0 0
Scrivener & White (accepted)	20,044 0 0

For the erection of twenty workmen's dwellings at Langwith, Derbyshire, for the Sheepbridge Coal and Iron Company. Mr. S. Rollinson, architect:—

Harper & Smith (accepted)	£3,090 0 0

For the erection of five shops and three houses at Corporation-street, Chesterfield. Mr. S. Rollinson, architect. Quantities supplied:—

Hewitt	£2,900 0 0
Stevenson & Weston	2,578 0 0
Forrest	2,193 0 0
Tutin	2,088 0 0
Greenwood	2,050 11 0
Slim (accepted)	2,050 0 0
Marples (withdrawn)	1,915 0 0

Accepted for the erection of a house upon the Bath-road, Reading, Berks. Messrs. Morris & Stallwood, architects. Quantities by the architects:—

Higgs (bricklayer)	£1,528 12 0
Sheppard (carpenter & joiner)	1,140 0 0
Millington (plumber, glazier, and painter)	405 0 0
Harris (plasterer)	279 0 0
Huntley & Co. (smiths)	223 0 0
Wheeler Brothers (masons)	127 0 0
Warmsley & Co. (slaters)	118 16 0

For five cottages at Katesgrove, for Messrs. Philbrick. Messrs. Morris & Stallwood, architects. Quantities by Mr. Morris:—

Goodey	£759 0 0
Filewood	723 0 0
Simonds (accepted)	672 0 0
Poffley (withdrawn)	635 0 0

Accepted for the erection of a house at Redlands, Reading, Berks, for Mr. Henry Lea. Messrs. Morris & Stallwood, architects. Quantities by the architects:—

Higgs (bricklayer)	£961 0 0
Woodroofe (carpenter & joiner)	800 0 0
Moffat (plumber, glazier, and painter)	287 10 0
Grover (plasterer)	195 0 0
Wheeler (mason)	86 13 0
Catchpool (smith)	86 11 2
Warmsley & Co. (slaters)	80 5 0

For Wesleyan chapel and schools at Windsor, Berks. Messrs. Morris & Stallwood, architects. Quantities by Mr. Morris:—

	Spire.	Fence.	Total.
Dove Brothers	£160	£260	£5,365
Shearburn	150	209	5,295
Hollis	137	358	5,075
Kelly	119	237	4,859
Woodbridge	120	270	4,754
Reavell (accepted)	125	271	4,329

For certain alterations and additions to the vicarage house of St. Mary's parish, Reading, Berks. Messrs. Morris & Stallwood, architects. Quantities by the architects:—

Wheeler Brothers (accepted)	£491 0 0

For the erection of lodges at Gilridge and Gabriels, and repairs and alterations to cottages at Greybury-lane, Edenbridge, Kent, for Mr. J. T. Morton. Messrs. Ingram & Hollands, architects:—

Gilridge Lodge.

Godley	£490 0 0
Jordan	475 0 0
Goodwin	415 0 0
Kesterton	356 0 0

Gabriels Lodge.

Jordan	£425 0 0
Godley	400 0 0
Goodwin	375 0 0
Kesterton (accepted)	299 0 0

Greybury-lane Cottages.

Jordan	£320 10 0
Kesterton	194 0 0
Goodwin	185 0 0
Godley (accepted)	150 0 0

Extra Works.

Charlwood Brothers	885 0 0

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